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Common Ware of the Loukkos Valley: A Preliminary Typology and Distribution Analysis of Common Ware in the Countryside of the Roman City of Lixus

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To the Graduate Council:

I am submitting herewith a thesis written by Emily E. Noyes entitled "Common Ware of the Loukkos Valley: A Preliminary Typology and Distribution Analysis of Common Ware in the Countryside of the Roman City of Lixus." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Anthropology.

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Common Ware of the Loukkos Valley: A Preliminary Typology and Distribution Analysis of Common Ware in the Countryside of the Roman City of Lixus

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To my mom for her unwavering support in all of my endeavors and to Nick for never letting me lose sight of the light at the end of the tunnel.

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Abstract

This study examines 144 sherds of common ware ceramics collected as part of the 2016 survey season of the joint INSAP-UT project titled *Gardens of the Hesperides: The Rural Archaeology of the Loukkos Valley* (Project Hesperides). The initial goal of this study is to create a preliminary fabric typology of these 144 ceramics, which are sorted into 7 groups: Noyes 1, Noyes 6, Noyes 8, Noyes 10, Noyes 11, Noyes 12, and Noyes 13. These groups are created based on fabric recipes and inclusions, and an analysis of these groups indicates the level of standardization of common wares in the Loukkos River valley. This study also establishes a preliminary chronology for these fabric groups. Although these groups cannot be tied to periods more specific than two centuries or more, this preliminary chronology is useful for illuminating wide diachronic changes in ceramic production over time. Finally, this study undertakes a distribution analysis of these common ceramics over the landscape of the Loukkos River valley. The distribution of fabrics in the river valley shows certain sites to be quite significant in the trade of common wares, and moreover suggests an increased level of economic integration in the countryside around Lixus. Ideally, this research will aid Project Hesperides in its study of economic development and settlement patterns in the Loukkos River valley and will contribute to the bibliography of common ware studies in northwest Morocco.

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Chapter 1

Introduction

The ruins of Lixus sit about 70 km south of Tangier, outside the modern city of Larache in northwest Morocco, and the city was occupied from at least the 8th century BCE to the 15th century CE (Aranegui and Mar 2009, 31; Cañete and Vives-Ferrándiz 2011, 128). Its continuous urban occupation from the Phoenician period to the Islamic period has made Lixus a site of considerable interest for archaeologists studying the Atlantic coast (Akerraz and Collins-Elliott, 2017; Cañete and Vives-Ferrándiz, 2011). Less attention, however, has been paid to the nature of rural settlement around the city, with a few notable examples, including surveys performed by the *Institut National des Sciences de l'Archéologie et du Patrimone* (INSAP) since 1997 (Akerraz and El Khayari, 2000; Tissot, 1877; Ponsich, 1966). A recent project, *Gardens of the Hesperides: The Rural Archaeology of the Loukkos Valley* (Project Hesperides), co-directed by Aomar Akerraz, the general director of INSAP in Morocco, and Stephen A. Collins-Elliott of the Department of Classics at the University of Tennessee, Knoxville (UTK) is aiming to explore settlement patterns and economic development of the Loukkos River valley through multiple phases. (Akerraz and Collins-Elliott, 2017). The ceramics analysis in this work is in contribution to this project.

This study examines 144 ceramic sherds collected as a part of the 2016 pilot season of this joint Moroccan-American project. The ceramics chosen for this analysis are unidentified common wares collected in the pilot season and analyzed by myself in the 2017 season of survey, and this selection process is further explained in Chapter 3. Common ware is often an understudied class of ceramics due to the fact that, despite their abundance in

the archaeological record, they provide relatively little immediate information pertaining to chronology or large scale interregional economic trends compared to fine classes of ceramics, such as African Red Slip in the Roman imperial period. Despite this, common wares prove useful for understanding intraregional patterns of ceramic production and trade, as well as the nature of integration between rural settlements and cities, such as the Loukkos River valley and Lixus. Macroscopic fabric analysis can provide a wealth of information regarding the production techniques of pre-modern potters, organization of labor, and utilization of the landscape. Moreover, a distribution analysis of ceramics within and between nearby rural settlements and the city may provide a glimpse into the nature of intraregional trade.

Macroscopic fabric analysis of these ceramic sherds has resulted in a preliminary typology based on fabric composition. This typology allows a discussion of ceramic manufacuring practices which produce variation in the region. This has allowed for a preliminary analysis of the level of standardization of common ware production across the Loukkos River valley spatially and temporally, which has indicated that utilization of the landscape in terms of clay sourcing likely changed over successive phases, and that common ware production techniques varied widely in the region. Dating was established by their context in a systematic survey collection in association with dateable finewares and amphorae. Comparison with illustrations of common ware ceramics from stratigraphic excavations of Lixus as well as Roman common wares of the western Mediterranean has also been utilized to create this typology (Aranegui, 2005; Aranegui and Hassini, 2010; Vegas, 1973). Finally, I have performed a distribution analysis of the different fabric types collected in the survey. An examination of distribution patterns of the fabrics sheds light on trade patterns in the river valley, and its economic integration with Lixus, touching on one of the primary research goals of the Project Hesperides. This distribution analysis suggests that there was a high level of intraregional ceramics trade occuring within the rural area around Lixus. This typology and distribution analysis, though preliminary, will prove valuable for future studies regarding standardization of ancient ceramic production and intraregional economic trends in the region around Lixus.

1.1 Background

1.1.1 Sociopolitcal History of the Region

The occupation of Lixus reaches as far back as the 8th century BCE, with archaeological evidence attesting a Phoenician presence during the Phoenician trade diaspora which marked this period in the Mediterranean. The city was inhabited into the 15th century CE. There was doubtless a population of indigenous peoples inhabiting the area before the arrival of Phoenician merchants, but little is known archaeologically about this Bronze Age population (Kably 2011, 78; Cañete and Vives-Ferrándiz 2011, 128). The occupation of Lixus is generally split into five distinct periods by the site excavators: the Phoenician period from the 8th to 6th century BCE, the Punic period from the 5th to 3rd century BCE, the Mauretanian period from the 2nd century BCE to the year 50 CE, the Roman period from the 1st to 6th century CE, and the Islamic from the 12th to 15th century CE, with the period between these final two phases relatively unknown (Aranegui and Mar, 2009, 31). More recently, Kably has proposed a periodization that instead refers to the period from the arrival of the Phoenicians to Roman provincialization (8th century BCE to 40 CE) as simply Mauretanian, further dividing it into four phases: Mauretanian I from the 8th to the mid-6th century BCE, Mauretanian II from the mid-6th to 4th century BCE, Mauretanian III from the 3rd century BCE to 33 BCE, terminated by the death of Mauretanian King Bocchus the Younger, and Mauretanian IV from 33 BCE to 40 CE, characterized by an interregnum and a period of vassal kings. This is followed by the Roman period, which lasts until around the late 3rd century CE, followed by what Kably refers to as an obscure period from the 3rd to 6th century CE (Kably, 2011, 81, 126). The advantage of the periodization proposed by Kably is that it refers to the land and people of the ancient region of Mauretania, rather than imposing on the area terms which imply a cultural hegemony which did not in fact exist. Nonetheless, in describing the archaeology of Lixus and the surrounding area, the former periodization is used most commonly in the literature, and will be used here alongside Kably's periodization. The archaeology of the city is supplemented by a few ancient sources such as Strabo (17.3.2-3), Pseudo-Scylax (112), Herodotus (4.196), and Pliny (*NH* 19.6), who describe various elements of the city, including its location and people, its mythical ties,

and its legendary history. Classical texts sometimes refer to Lixus as the oldest Phoenician settlement in the western Mediterranean, and Pliny claims that the temple of Hercules near Lixus is even older than the better-known temple in Gades, providing further evidence that the city likely had foundations reaching further back than Phoenician the arrival (Pliny *NH* 19.63; Gras 1992, 29).

The Phoenician period, corresponding to Kably's Mauretanian I, begins during the Phoenician trade diaspora which resulted in widespread expansion of Phoenician merchants and subsequent establishment of merchant settlements across the Mediterranean, from the Levant to the Atlantic coast (Aubet, 2001). From the 9th to the 7th century BCE, culturally heterogeneous settlements were established north and south of the Straits of Gibraltar, participating in various economic activities which took advantage of pre-existing local trade practices (Cañete and Vives-Ferrándiz, 2011, 128). The heterogeneity of the Phoenician trade diaspora may be understood in the context of contact with the indigenous inhabitants of the Atlantic coast, and more archaeological investigation into these Bronze Age inhabitants of Morocco should prove beneficial to the study of this period in Lixus and the surrounding rural landscape. The classical literature regarding this period is split between describing the natives as nomads by Herodotus (4.196) to describing them as an economically and politically advanced, war-like, sedentary people by Pseudo-Scylax (112) (Kably, 2011, 88). It seems likely that the pre-Phoenician peoples were somewhat closer to latter interpretation, as Phoenician practice more often than not consisted of integration into a preexisting trade system. Such a system may not have existed in a nomadic community. Thus, the socio-economic features of this early period on the Atlantic coast, following general patterns of Phoenician settlements across the Mediterranean, were likely marked by an integration into regional exchange networks, though again a lack of sufficient information regarding the pre-Phoenician inhabitants of the area in question makes analysis more difficult and conjectural (Aubet 2001, 118; Vives-Ferrándiz 2008). It is during this period, particularly the 7th century BCE, that the first evidence for public building begins in Lixus, which would continue developing into an urban center in subsequent phases (Aranegui, 2005; Aranegui and Hassini, 2010).

The Punic period follows the Phoenician, lasting from around the mid-6th/5th to the 3rd century BCE, roughly corresponding to Kably's Mauretanian II. This period is begins with the end of the Phoenician diaspora, marked by the fall of Tyre, the seat of Phoenician authority in the east, in the mid-6th century, and the subsequent shift of power to Carthage. There has been some debate over whether the Punic period represents a true shift from the preceding Phoenician phase, and whether the term itself is appropriate to describe the political state of the central and western Mediterranean at this time, especially in the case of Lixus and the Atlantic coast region, which seems to have had closer economic and cultural ties to the Iberian Peninsula than the central Mediterranean and Carthage (Kably 2011, 89; Ferrer and Alvarez 2009, 206; Papi 2014). Aranegui and Hassini (2010, 109) argue that this term is valid due to evidence of abandonment of a number of sites to the south of Lixus in the mid-6th century BCE, claiming that this is a sign of the shifting socio-political atmosphere at the end of the Phoenician period. The issue posed by this terminology lies in the true nature of Carthaginian influence as far east as the Atlantic, and whether it was significant enough to warrant such a blanket categorization, an issue which Papi has discussed in a more recent review of major sites in the region (Kably 2011; Papi 2014, 217).

The Mauretanian period in northwest Morocco begins around the second quarter of the second century BCE and lasts until 50 CE. Kablys periodization splits this phase into Mauretanian III and IV, divided by the death of the Mauretanian King Bocchus in 33 BCE and the ensuing interregnum, an event which profoundly changed the nature of Roman influence in Mauretania as the area became a vassal state of the Romans for the following century. The first half of the Mauretanian period is characterized by the rule of kings, beginning perhaps with Baga in the 3rd century, though the development and foundations of the monarchy remain unclear (Kably, 2011, 96). It is during this period, especially the Middle Mauretanian/Mauretanian IV phase, that Roman influence in North Africa became increasingly significant. After the Battle of Thapsus in 46 BCE, Caesar gained control of north Africa, as the territory of Juba I in the northeast became the province of *Africa Nova*, and everything to the west of the Roman territories remained under Mauretanian kingly authority (Roller, 2003, 91). The Mauretanian kings often involved themselves in Roman conflicts in north Africa, and Bocchus the Elders actions in the Jugurthan War (111-105

BCE) led the Roman state to declare the king a friend and ally to the Romans (Kably, 2011). Thereafter, the Mauretanian kings often supported the Romans in conflict. In 49 CE, the Mauretanian royalty was split between the joint kings Bocchus the Younger and Bogudes, ruling the east and west of Mauretania, respectively. Bocchus and Bogudes chose opposing sides in the Roman civil war, Bocchus siding with Octavian and Bogudes with Marc Antony (Kably, 2011, 97). Eventually, Bogudes was forced into exile in 38 BCE and Bocchus died in 33 BCE, leaving no royal heir to the Mauretanian throne (Roller, 2003, 94-5). After this, imperial historian Cassius Dio (45.48) tells us that Mauretania was made a Roman province, though this is problematic, as it seems to conflate the death of Bocchus with the execution of Ptolemy nearly a hundred years later in 40 CE by the emperor Caligula, eliminating the vassal kings from the historical record. Moreover, it anachronistically conflates the Roman Republican idea of a province with the later Roman Imperial province. After the kings death, the kingdom remained in a state of limbo, and Augustus was reluctant to incorporate the region into the empire due to civil war in Rome. Finally, after Augustuss victory in Rome, Juba II, who had been brought to Rome after Caesars victory over Numidia at the Battle of Thapsus, was placed on the throne of Mauretania in 25 BCE (Roller 2003, 97-100; Coltelloni-Trannoy 1997, 229). He and his son, Ptolemy, would be the vassal kings and Mauretania a client state of Rome until Ptolemys execution by Caligula 65 years later (Kably 2011, 110; Coltelloni-Trannoy 1997). It is during this period that the economy of Lixus begins flourishing, reaching its height under Juba II in the 1st century BCE. During this phase and the following one, the city of Lixus was involved in the production and exportation of murex, a prized purple dye in the ancient world, and fish products such as *garum*, a fish sauce popular across the empire, and *salsamenta*, a salted fish. These wealth of Atlantic resources contributed to the increased importance of Lixus in the Roman period (Ponsich, 1982).

In 40 CE, the Roman emperor Caligula assassinated the final vassal king of Mauretania, Ptolemy, suspecting him to be part of a conspiracy plot. Ptolemy, among other things, was known for his inclusion of many freedmen in his royal court, and one of these freedmen, Aedemon, vowed to avenge Ptolemys wrongful death, leading a revolt against the Romans which was finally quashed in 42 CE by the succeeding emperor Claudius. It is around this

time that Claudius fully annexed the region of Mauretania, assigning Marcus Fadius Celer as governor of the two new Mauretanian provinces in 42 CE (Kably, 2011, 115). These two Mauretanian provinces consisted of *Mauretania Tingitana* in the west, of which Lixus was a part, and *Mauretania Caesariensis* in the east. The economy of *Mauretania Tingitana* and Lixus particularly saw continuation marked by intensification during the Roman phase. The economy continued to consist chiefly of an exploitation of marine resources which characterized the Atlantic coast in the centuries preceding Roman conquest, and these resources were exported widely throughout the empire (Ponsich, 1982, 839). Indeed, these natural resources likely played a significant role in the economy of Lixus reaching back into the Phoenician period (Kably, 2011, 122). The most important of these resources were *garum*, *salsamenta*, and the purple dye collected from murex shells (Ponsich, 1982; Kably, 2011). Moreover, the end of the Mauretanian period coincides with an increase in rural sites, suggesting increased agricultural exploitation in the region, with the production of wine, olive oil, and cereals also playing a significant role in the Roman period economy of the city (Kably, 2011, 111,122-3). There is a notable lack of amphora kilns in the region, despite the exportation of these resources, and some have suggested that perhaps amphorae were imported from elsewhere for this purpose (Teichner and Pujol, 2008). The prosperity of these industries in Lixus continued from the 1st century BCE well into the 3rd century CE, when they declined as the result of a wider economic crisis across the Roman empire during this period (Ponsich, 1982, 839).

At the end of the 3rd century CE, the emperor Diocletian ordered a scaling back of the Mauretanian provinces, retaining only *Mauretania Tingitana*, and territory to the north of the Loukkos River, including Lixus, marking a decline in Roman presence in the area (Kably, 2011, 126). The Roman period ends in the 6th century CE, after the shift of Roman power to Constantinople in the east along with the loss of the African provinces, with a long period of depleted population density in the region ensuing (Aranegui and Mar 2009, 31; Coltelloni-Trannoy 1997, 228-9). The city of Lixus continued to be populated during the early Medieval period, under the Arabic name Tushummus, though beginning in the 14th and 15th centuries CE, importance gradually shifted to the nearby modern city of Larache (Aranegui, 2005, 37). The lack of Portuguese presence on the hillsides around the

city suggests that the area was depopulated by the mid-15th century, and this is further suggested by the lack of Portuguese ceramics in the city of Lixus, especially compared to their abundant presence found in nearby settlements (Aranegui, 2005, 38).

1.1.2 Common Ware Studies in the Western Mediterranean

Since the second half of the last century, ceramics studies have experienced a surge of innovative research. During the processual shift in archaeology in the mid-century, the study of ceramics in the archaeological and ethnographic record became increasingly rigorous, with works such as Anna Shepard's 1957 contribution *Ceramics for the Archaeologist* (Shepard, 1957). This text served to provide a baseline for the study of ceramics which contextualized a field of study that had previously been concerened with subjective, difficult to measure attributes, especially those aesthetically pleasing attributes of pottery that do not always extend to the bulk of the archaeological ceramic record. Decorative attributes as well as type fossils were emphasized as markers of cultures at the expense of any type which fell outside of these categories. Shepard's major contribution was in illustrating the utility of studying ceramics outside of these rigid typological schemes, and instead studying them as products of ancient potters in specific contexts. This anthropological approach was expanded in the following decades, with authors exploring the analytical possibilities of ceramics through their production, use, and disposal, both in archaeological and ethnographic contexts. Rye (1981) emphasized an ethnographic approach in order to more fully understand variation introduced throughout the production process of ceramics. Sinopoli (1991) similarly discussed the process of ceramics production, and further explored methods of recognizing and undertsanding this production process in the archaeological record and the questions which such ceramics analysis may answer. Orton et al. (1993) expanded on these works, reserving less of their work for an ethnographic understanding of pottery production and rather emphasizing the analytical possibilities of ceramics and the development of ceramics studies over the previous decades. The move away from an emphasis on typological schemes was also represented in the study of Roman ceramics, as archaeologists from the 1970s onward began studying Roman pottery in the context of post-processual questions of identity and ideology of ancient Roman citizens and subjects (Peña,

2007). This shift to an emphasis on the complex role of pottery in the ancient world has allowed for an exploration of the wealth of information ceramics may offer the archaeologist regarding organization of labor, regional economic trends, and daily life.

It is due to studies such as these that common and coarse ware studies were able to develop in archaeology. The study of unpainted, often unfinished, common wares did not catch the attention of archaeologists in the early art historical and typological phase of the field, when painted, decorated ceramics were more emphasized in publication (Orton et al., 1993, 5). Study of common wares must go beyond an analysis of superficial decoration, which is often absent, and this manifests in an emphasis on fabric analysis - or the clay and inclusion recipe which make up the ceramic composition - as well as the study of manufacturing practices, distribution, and consumption. Fabric analysis at the macroscopic level, which has been performed on the ceramics in this study, can provide valuable information about production techniques and standardization, and at the microscopic level can provide archaeologists a window into ancient pottery manufacturing processes and clay sourcing. Often, common wares comprise the vast majority of the ceramic archaeological record, and the still developing standardization of common ware studies provides an oppurtunity for utlizing this abundant resource for analysis.

The first use of the term "common ware" (*cerámica común*) to discuss Roman ceramics appeared in work by Lamboglia (1950), and the definition of the term has been in flux since. At the most basic, common wares are often defined as wares which emphasize utilitarian function over aesthetic design, but this definition does not tackle the issue of circulation (Cortese, 2005, 325). In the early history of common ware studies in the Mediterranean, this utilitarian pottery was often considered marked by its local production in the place of its discovery, but ceramics scholars in the 1970s and beyond began moving away from this rigid definiton (Mannoni, 1972; Ratti Squellati, 1987). Despite movement towards a standard definition of common ware in the Mediterranean, there is still debate over what is considered subject to common ware studies, and decreased emphasis on form and function has led Roman common ware studies in the way of mineralogical analysis, following a global trend towards highlighting fabric analysis in ceramics studies (Cortese, 2005, 326).

Common ware studies in the western Mediterranean has produced a relatively small bibliography compared to other areas in the Roman world, but nontheless a few significant contributions prove vital to any study of Roman common wares in this region. Mercedes Vegas' *Cerámica común romana del mediterráneo occidental* provides a mostly comprehensive overview of Roman ceramics in the western Mediterranean from the Republican period to the 4th century CE, though in Vegas's definiton of common ware, amphorae are also included (Vegas, 1973). The author developed a typology of common ceramics in the western Mediterranean by compiling ceramic finds from sites spanning from Italy to the Atlantic coast of Africa and developed 64 types of common wares in the western Mediterranea. Such a task had not been previously undertaken, and made some types as useful as finewares in dating contexts. Such a work is especially vital for contexts which yield no fine ceramics typically utilized in dating. Though Vegas' work focuses on sites to the north in the western Mediterranean, his discussion of sites in the Maghrib allows for suitable comparison with common wares in ancient Mauretania (Vegas, 1973, 2).

Important contributions have been made to the study of common wares in the western Mediterranean by Michel Bats, whose work has illuminated foodways in Roman provinces in France and has provided an anthropological analysis of common ceramics involved in daily meal preperation (Bats, 1988). *Les céramiques communes de campanie et de narbonnaise*, a collection edited by Bats, provides a wealth of studies on common ceramics in Campania and the Roman province *Gallia Narbonensis*, along with many useful dateable typologies for comparison (Gasperetti, 1996; Scatozza Horicht, 1996; Federico, 1996; Olcese, 1996). These typologies are vital for comparison across sites, and useful in studies of common ware further to the north of the western Mediterranean, but do not provide useful comparanda for this study. Unfortunately such large scale regional syntheses have not yet been published for the region of the Maghrib al-Aqsa, either in the Roman or Islamic periods, though a few studies are noteworthy in the region.

The excavation reports from Lixus make mention of the stratigraphically excavated common ceramics from the city in the Roman period, though these reports focus on painted and unpainted finewares, even though common ceramics comprise the majority of ceramics excavated in all phases (Aranegui, 2005; Aranegui and Hassini, 2010).This is often the case for

excavation reports, making a comprehensive work on the scale of Vegas' all the more difficult to accomplish in northwest Africa (Vegas, 1973; Gliozzo et al., 2009). In Boube's analysis of ceramic materials from Roman tombs in Chellah common ceramics are discussed but a typology is not developed, resulting in an unfortunate dearth of information for comparison with other common ware assemblages (Boube, 1999). D'Aco has produced a study of common ceramics from *Thamusida* with a collection of vase morphologies that provides a chronological framework, but a typology of common ceramics such as this is largely outside the norm in Morocco. Moreover D'Aco's analysis is unpublished and difficult to acquire from the University of Siena, and therefore is not readily available for typological comparison (D'Aco, 2005).

Due to this there is an unfortunate scarcity of dateable typologies for the region (Gliozzo et al., 2009, 84). Gliozzo et al. (2009) have produced a recent study employing thermoluminescence, optical microscopy, scanning electron microscopy, and X-ray fluorescence to develop a chronology of selected common ware ceramics dating to the Roman and Islamic periods from the site of Thamusida near Rabat. This study not only produced dates for sherds with no chronology, but overturned previously proposed chronologies that had been based on typological comparison. Such scientific methods, as illustrated by this study, can prove vital in establishing more certain chronologies for vessels with shapes that often span centuries (Gliozzo et al., 2009, 84). As with most scientific analysis in archaeology, the cost of such testing often does not allow for widespread, in depth analyses such as those employed in this study. In future reasearch, utilization of such testing on a wider scale would undoubtedly profit the development of dateable typologies for common wares in Morocco.

The study of medieval Islamic ceramics in Morocco has faced similar issues as the study of Roman ceramics, with most typologies and excavation reports emphasizing fine, green glazed wares over common ware (Gliozzo et al., 2009). The Lixus excavation reports make mention of medieval ceramics in the city, but extended discussion is reserved for painted, decorated wares (Aranegui, 2005; Aranegui and Hassini, 2010). Redman has provided a more comprehensive description of common wares from a number of sites, chiefly collected through survey of a Islamic sites such as Qsar es-Seghir (Redman, 1984). Benco has produced a rather comprehensive analysis of the ceramic forms from the Idrisid site of al-Basra, dating from

the 8th to 10th century CE, with a typology and a chronology of common wares, and this work provides a significant resource in the study of Islamic wares in Morocco (Benco, 1987).

A recent volume edited by P. Cressier and E. Fentress, *La céramique maghrébine du haut moyen age (VIII-X siècle)*, has provided another valuable resource in the study of Islamic ceramics in North Africa. Although the text does not focus on common wares, with some contributions devoted instead to glazed and painted finewares, many authors lend extended discussion to common wares from sites across the Maghreb from the 8th to 10th century CE. Regarding northwest Morocco in particular, studies on the ceramics from Volubilis and al-Basra in this collection provide a valuable resource for ceramicists of Medieval Islamic pottery seeking chronological typologies, or studying continuty, connectivity, or modes of production in the high Medieval period in the region (Benco, 2011; Atki, 2011).

Though it is clear that common ware studies in Morocco is in its infancy, more recent research such as that by Gliozzo et al. and collections such as that produced by Cressier and Fentress indicate the direction in which such studies may be going (Gliozzo et al., 2009; Cressier and Fentress, 2011). An emphasis on fabric composition and ceramic production methods in the creation of typologies will allow for cross context comparisons which may yield novel analytical avenues for archaeologists working in regions with poorly developed ceramic typologies. This study aims at providing the preliminary steps towards such a typology for the area around Lixus in the Roman period, with hopes of furthering the development of common ware studies in the region.

1.2 Project Hesperides

The pilot season of the joint Moroccan-American project, *Gardens of the Hesperides: The Rural Archaeology of the Loukkos Valley* ran from July 10, 2016 to August 5, 2016. The project is run in conjunction with the *Programme Thématique d'Appui á la Recherche Scientifique* undertaken by the *Institut National des Sciences de l'Archéologie et du Patrimone* (INSAP), which has been conducting surveys in the area since 1997 (Akerraz and El Khayari, 2000). Project Hesperides is co-directed by Aomar Akerraz, the general director of INSAP, and Stephen A. Collins-Elliott of the Department of Classics at the

University of Tennessee, Knoxville. The first phase of the project, currently ongoing, consists of systematic field survey for the 2016-2018 seasons, with the second phase of the project, excavation, planned for 2019-2023.

The chief objectives of the project, briefly, are four: to model rural settlement and economic patterns of the Loukkos River valley from the Atlantic coast near Larache, the modern city near Lixus, to El Qsar el-Kabir, near the ancient site of *Oppidum Novum*; to model the ancient use of plant and animal resources related to wine and olive oil production; to explore the impact of the region's provincialization by the Roman emperor Claudius after 40 CE on the surrounding countryside; and to compare the development of the regional economy of the Loukkos River valley with the broader western Mediterranean (Akerraz and Collins-Elliott, 2017).

The methodology of the first phase of the project consists of systematic field walking and collection and processing of surface collection artifacts, as well as photogrammetry to map and document archaeological features. The methodology is modeled on a systematic siteless survey, and north-south tracts were arbitrarily set up with a width of 500 m and at 500 m intervals. Within each of these tracts, the topographic unit (TU) was the standard definition for either a surveyed field or an individual feature and was labeled consecutively in the 2016 season from TU0001, TU0002, etc. (Akerraz and Collins-Elliott, 2017). Collection of finds within the units was performed systematically and non-systematically if the sherds or artifacts were significant for dating (i.e. diagnostic sherds). The systematic collection was carried out by spacing the field walkers 10 m apart along a line at the boundary of the unit, and having them collect any artifacts within a window of approximately 1 m on either side. The walkers continued spacing themselves and walking until the entirety of the field was covered, resulting in a total systematic coverage of 20%. If systematic walking was not possible, such as in the case of features or unwalkable terrain, only a non-systematic grab sample was collected. All finds from grab sampling and systematic sampling were kept separate for analysis, and may be referred to in Appendix A (Akerraz and Collins-Elliott, 2017). Analysis of the finds was a multi-stage process, consisting of a preliminary classification to organize the artifacts into general categories and a secondary more detailed analysis, and this information was entered into an MS Access database for later quantitative

analysis. The 2016 field season resulted in 1008 systematically collected sherds and 194 non-systematically collected sherds, bringing the ceramic finds total to 1202, split into 13 categories by A. El Khayri and S. Collins-Elliott (Akerraz and Collins-Elliott, 2017). It is from these finds that 144 sherds, which has previously been desginated unidentified or common ware, were grouped according to inclusion presence, fabric texture, and color. These sherds are the subject of the subsequent fabric analysis, typology, and distribution analysis.

1.3 Research Goals

The goal of this analysis is to provide a preliminary fabric typology for the coming seasons of field work in the Loukkos River valley as part of Project Hesperides. An illumination of fabrics used in the area will prove a great aid for future analysis of common wares collected in survey as well as those excavated in coming years. Moreover, a brief discussion of the sedimentology of the region and clay sourcing studies may provide an initial understanding of clay sources in the area. Dating is notoriously difficult for unslipped and unpainted common wares, such as the ones discussed here. However, association in systematically surveyed sites with other dateable finewares and amphorae allows for preliminary discussion of chronology for otherwise non-dateable sherds outside of a stratigraphic context. These two elements of the analysis, a look at the geology of the Loukkos River valley in terms of clay sourcing studies and a typology and analysis of the fabrics, will be discussed in the next two chapters. This will be followed by a distribution analysis of ceramics of each fabric found in the survey and a discussion on what this might tell us about the economics of the region surrounding Lixus.

Chapter 2

Clay Sources and Geology

2.1 Clay Sourcing

Clay sourcing studies give archaeologists the ability to associate ancient sherds with specific natural clay deposits and can shed light on the way past peoples utilized the natural resources of their landscape. In the Roman world, for example, it would have been desirable for kilns to be built near natural clay sources, due to the difficulty in transporting large quantities of clay over wide distances, and thus identifying clay sources may aid in the discovery of kiln sites (Sherriff et al., 2002; Greene, 1986). Clay sourcing allows archaeologists to perform more nuanced analyses of the effect of clay sourcing on urban and economic development is clear. However, clay provenancing studies require the employment of a number of specialized methods of analysis, such as mass-spectrometry, petrographic thin section analysis, x-ray diffraction, and more. Mass-spectometers are machines which break down the chemical composition of clays to analyze the mass of molecules in a sample. Petrographic thin section analysis is a vital tool in clay sourcing studies, as it allows a detailed exploration of mineralogical inclusions which make up clay fabrics. Similarly, x-ray diffraction is useful for establishing the abundance of certain mineral incusions in ceramic fabrics. These processes are often destructive, and moreover require proper laboratory equipment that may not be easily accessible. These factors, as well as a lack of well developed geological exploration in certain regions, pose obstacles for some archaeologists interested in analyzing clay sourcing. The following chapter surveys the potential of clay sourcing studies and explores the

difficulties in employing the necessary methods, which have resulted in incomplete analysis of clay sources in many regions.

In Cyprus, Renson et al. (2013) have been able to establish a lead isotopic composition signature which can be tied to ceramics produced on that island, and thus giving archaeologists the ability to source ceramics which may otherwise range widely in chronology and style. This study illustrates the possibility for clay sourcing to illuminate interregional trade in the ancient world in terms of large scale distribution across the Mediterranean. The difficulty lies in the ability for other archaeologists to employ the methods necessary to compare lead isotope signatures to those from Cyprus, as the analysis requires destruction of sherds and high powered mass-spectrometry tools (Renson et al., 2013, 521). The mineralogical analysis of ceramics through petrographic thin samples and x-ray diffraction may produce results which speak to ancient potters intentionality in choosing certain clays, as Phillips and Morgenstein (2002, 598) illustrated the evidence for an ancient emphasis on sourcing clays from an area known chiefly for its wide variety of clay colors. When petrographic thin section is compared with geological sections of the surrounding landscape, a new understanding of ceramics production may present itself. In northeast Africa, at the Roman site of Leptiminus in Tunisia, Sherriff et al. (2002) employed x-ray diffraction and petrographic thin sampling to analyze ceramics excavated from a known kiln site. The researchers were able to distinguish with relative certainity the clay bed from which virtually all ceramics produced in the city were sourced, despite this clay bed being no longer exposed on the surface (Sherriff et al., 2002).

The utility of petrographic analysis in northwest Morocco has been demonstrated in studies such as those by Khlaki et al. (2016), which analyzed Mauretanian period amphora from the site of Rirha (Sidi Slimane), about 100 km to the southeast of Larache. Here, the investigators successfully discerened which clay fabrics were local and which were imported due to the inclusion of a garnet not common to the region. Moreover, the differences in clay paste composition were indicative of differences in firing temperature, with micaceous muscovite appearing only between 700 and 800 degrees celsius, and further the researchers were able to distinguish between sieved and non-sieved additions to the clays, revealing them

as products of different workshops on the basis of clay processing practices (Khlaki et al., 2016, 46).

The macroscopic ceramics analysis presented in the following chapters demonstrates a vital first step towards studies such as those just described. Such scientific analyses are evidently useful in opening more nuanced avenues of ceramics research, but cannot be performed without a preliminary macroscopic study to assess the significance of certain fabrics over others. In the analysis presented in the following chapters, I have found some fabrics to be more ideal for further scientific study such as petrographic thin section analysis and, ideally, future research into the common ware of the Loukkos River valley will expand on these findings through the discussed scientific methods.

2.2 Geology of North Morocco

Morocco is well known for its clays and ceramics and is among the top 20 producers of clay products in the world today (El Ouahabi et al., 2014a, 146). Although the global exploitation of Moroccan clay and ceramics only reaches back into the 1970s, the local exploitation of Moroccan clay resources reaches back much further, undoubtedly into prehistory (Manni et al., 2017, 145). The characterization of clay from the areas of Fes, Meknes, Salé, and Safi, which together produce about 80% of Moroccan clay materials, is well studied (El Ouahabi et al., 2014b; Manni et al., 2017). Ceramic production in these regions is generally less labor-intensive in terms of raw material processing, as the mineralogical composition of raw clays south of the Tangier peninsula are more conducive to forming and firing into pottery. This is due to the presence of illitic clays, which are often used as a fluxing material in ceramic pots, plates, and building material (El Ouahabi et al., 2014b, 46).

The north and northwest, which includes Larache and the ancient city of Lixus, is unfortunately much less studied, despite being rich in clay deposits (El Ouahabi et al., 2014b, 36). Generally, the clay composition of the region around Tangier consists of a Cretaceous clays and limestones and Pliocene blue marls. In the calcareous facies, especially from the limestone and blue marls, the natural aggregates are composed primarily of an abundance of quartz and calcite, sometimes amounting to 50% of the mineralogical composition of

the clay beds and containing very little organic matter (El Ouahabi et al., 2014b, 40-3). This is represented in the calcareousness of all ceramic fabrics presented in the following chapter. Notably, the clays in the northern part of Morocco near Tangier and Tétouan likely required the addition of some sort of organic polymer to increase plasticity due to their variable mineralogical composition, making ceramic manufacture more labor intensive than in the south (El Ouahabi et al., 2014b, 48-9). Moreover, unlike southern Morocco, northern Moroccan clay is characterized by the presence of smectites (montmorillinites) which often require the mixing of another clay to increase strength and reduce shrinkage and cracking (El Ouahabi et al., 2014b, 46). Interestingly, in a general analysis of the clays of northern Morocco, Fillali et al. (2005, 205) have remarked on the parallels between the composition of the Tangier peninsula and the Baetic Mountain Range in Spain. It is likely that this general composition extends to the region around Lixus, fewer than 100 km to the south, though this is unclear without more targeted analysis of the clays in the region.

Geological and geomorphological analysis of the landscape around Larache and Lixus have focused on the lower Loukkos River estuary. The changing characteristics of the estuary have been influential on the settlement of Lixus in the 8th century BCE to the abandonment of the city from the 6th to 11th centuries CE during a period of progressive infilling of the estuary and subsequent shift of ports to nearby Larache (Carmona and Miguel Ruiz 2009, 842; Palma et al. 2012; Fillali et al. 2005). In this context, soundings have been taken by Carmona and Miguel Ruiz (2009) and radiocarbon dated. The results illustrate the changing compositions of the sedimentology of the estuary from the 4th millennium BCE into the 20th century. This study does not discuss archaelogical ceramics, but it does examine the changing mineralogical composition of clays, which in the future may be utilized by x-ray diffraction analysis of ancient ceramics. In the context of archaeological excavations, Carmona González (2005) and Carmona González and Ruiz (2010) have presented similar reports on the changing geomorphology of the Loukkos river basin and the effect this has had on the region in the excavation reports from Lixus. Though again these discussions do not focus on clay sources in particular, they may serve as a foundation for more targeted studies which employ tools such as petrographic analysis, x-ray diffraction, and mass-spectrometry to analyze clay composition.

2.3 Discussion

These above methods are invaluable for any future analysis of clay sources which may occur in the region, as they provide a foundation for understanding the geomorphological characteristics of the region of the Loukkos River valley. In future studies of common wares in this region, petrographic analysis and a more comprehensive analysis of clay beds in the Loukkos valley will ideally build on the fabric analysis presented here. Generally, the ceramics in this study use clays which are not out of place in the geology of northwest Morocco in terms of calcareousness and inclusions. Either quarzite or calcite, and often both, appear in every fabric in this typology, and these minerals are typical of the Atlantic coast of the Tangier peninsula, though again clays of the Baetic Mountains are quite similar (Fillali et al., 2005). However, a preliminary analysis of the presence and absence of certain mineral inclusions across the different fabrics illustrates that there were likely either many clay sources in the region, or certain fabrics were imported, and this will be discussed in further detail in the following chapter. However, in the case of unique inclusions, the role of the Loukkos River in introducing variation to clay sources should not be dismissed. As an understanding of clay bed compositions in Loukkos River valley develops, these inclusions can be tied to their sources with much more certainity, which may illuminate ancient utilization of the landscape.

Chapter 3

The Ceramics

3.1 Methodology

The ceramics included in the study were collected as part of the 2016 pilot survey season of Project Hesperides. The methodology of Project Hesperides was discussed in the previous chapter, and consisted of a systematic and non-systematic (grab) collection of artifacts. The systematic and grab samples have been kept separate throughout analysis in assessing their quantitative distribution. In this study, there is no distinction made in analysis between systematic and grab samples, although this information has been retained and is included in Appendix A. In the 2016 season, the ceramic finds were sorted into categories that could be broad, such as amphora or common ware, or specific, such as African red slip. The ceramics were sorted by Abdelaziz El Kahyari of INSAP and Stephen Collins-Elliott of UTK by the end of the pilot season. Out of the 1202 total ceramics collected, in systematic and grab collections, 348 were classified as either common ware or non ID, meaning they were not identified in the course of the 2016 season. These finds are maintained by the Ministry of Culture in Larache.

During the course of the second season of survey in 2017, I reexamined these 348 sherds macroscopically using a handheld 10×18 mm and 20×12 mm magnifier. My analysis focused on fabric recipe and inclusions, ceramic firing, and vessel form. Sherds which exhibited the same fabric composition, distinguished especially by inclusions, were grouped together. Estimation of the percentage and size of inclusions was aided by the use of charts developed

by Russian sedimentologist Shvetsov and reproduced by Terry and Chilingar (1955), and these estimations were used to classify the ceramic categories as fine (under 10%), medium coarse (10%-19%), and coarse (over 19%). These groups were developed from diagnostic sherds (rims, bases, or handles) which could provide information regarding the form and function of the vessels associated with the fabric. Each sherd or group of sherds, kept separate by topographic unit (TU) and survey method (systematic or grab), were given new lot numbers proceeding from 2017S-001, 2017S-002, etc. Of these 348 sherds, 144 were able to be successfully classified into 7 fabric groups: Noyes 1, Noyes 6, Noyes 8, Noyes 10, Noyes 11, Noyes 12, and Noyes 13. These groups were named and numbered consecutively, and groups which contained no diagnostic sherds or fewer than 5 body sherds were eliminated from analysis (i.e. Noyes 2, Noyes 3, Noyes 4, etc.).

Quantification of sherds relies chiefly on weight, with sherd count and estimated vessel equivalent (EVE) included in some places. There has been extended discussion as to the most effective methods of ceramic quantification in archaeology, as it plays a significant role in the ability to successfully and meaningfully compare assemblages across contexts (Orton, 1975, 1982, 1997; Fentress, 2000). EVE has been shown to produce quantification with the least amount of bias due to fragmentation and collection and overall fewer assumptions invoked regarding the life cycle of the ceramics, but is more effectively utilized in larger samples and larger scales of context than the ones in this study (Orton, 1975, 31). Weight is often considered more reliable than sherd count when analyzing ceramics of the same class, as it also reduces fragmentation bias and requires fewer assumptions than quantification based on sherd count or minimum number of individuals/vessels represented (MNI). MNI is considered the least reliable measure for archaeological ceramics quantification, as it is significantly affected by varying breakage and recovery rates, and thus cannot be used in any meaningful way to compare ceramics quantities across contexts (Orton, 1975, 31,34-35). For these reasons, quantifcation of the sherds in this study will rely on weight, although EVE and sherd count are provided in Appendix A. Rough estimates of the relative abundance of fabric groups in each site have been calculated using percentages of total weight in grams.

Fabrics are placed within a general chronological framework, which is reliant on comparison with established chronological common ware typologies as well as association

Table 3.1: Diagnostic fragments of Noyes 1 fabric; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Fragment	Drawing	Photo	Context	Site	Type	n_{fr}	n_w	n_e	Comparanda	Proposed Dates
2017S-071	Fig. B.1	Fig. C.3	TU0080	N/A	Handle	1	27	0	Aranegui (2005, fig. 22.9)	1st-2nd c. CE
									Vegas (1973, type 57)	2nd c. CE
2017S-006	Fig. B.2	Fig. C.2	TU0019	TU0018	Rim	1	5	0.03	Aranegui (2005, fig. 1.11)	2nd-1st c. BCE

with dateable wares associated by site. Both of these methods result in a chronology that ranges at least two centuries, and often more. This is due to the nature of common ware, which often exhibits diagnostic shapes which remain relatively unchanging over longer periods of time than finewares and amphorae. Dateable finds have provided chronologies for established sites which are often broad, but may still substantiate chronologies produced from diagnostic comparison. Thus, although these chronologies are largely preliminary, they provide a starting point for understanding broad diachronic changes in common ware, and in some cases amphorae, production and trade in the Loukkos River valley.

3.2 Fabric Descriptions

Noyes 1 Fabric (N1) is characterized by a buff to reddish yellow color (5YR7/6 to 5YR7/8). Thirty-four fragments belong to this type, weighing 321 grams (see Table 3.1). Pottery fragments exhibit generally uniform firing and color. Some have a pale buff self-slip on the exterior, suggesting closed shapes, or on in some cases on both sides, suggesting open shapes. Fabric has a fine texture, with about 3% inclusions, and it is highly porous. Inclusions chiefly consist of white mineralogical elements, no larger than 3mm in length, but there are a few instances of possible grog or reddish argillaceous rock fragments, up to 4 mm in length. Diagnostic sherds from this type include handle fragment 2017S-071 (fig. B.1), about 5 cm long and 2 cm in diameter, probably belonging to an amphora, and rim fragment 2017S-006 (fig. B.2) approximately 14 cm in diameter, also likely from an amphora. The only use wear is seen on the handle fragment. Its convex curving surface has been chipped and eroded, possibly as a result of handling. The wall thickness of sherds and little curvature, as well as the evidence for closed shapes, suggests storage or transport function for this fabric, although some thinner walled sherds may have belonged to utilitarian jugs or bowls, as the

Table 3.2: Diagnostic fragments of Noyes 6 fabric; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Fragment	Drawing	Photo	Context	Site	Type	n_{fr}	n_w	n_e	Comparanda	Proposed Dates
2017S-007	Fig. B.6	Fig. C.4	TU0018	TU0018	Rim	1	7	0.07	Vegas (1973, type 47)	1st-3rd c. BCE
2017S-009	Fig. B.5	Fig. C.5	TU0019	TU0018	Rim	1	6	0.07	Vegas (1973, type 26)	1st c. BCE-1st c. CE
2017S-010	Fig. B.4	Fig. C.6	TU0019	TU0018	Rim	1	5	0.8	N/A	N/A
2017S-076	Fig. B.3	Fig. C.9	TU0040	Douar Dhayriya	Rim	1	15	0.06	Vegas (1973, type 5)	1st-3rd c. BCE
2017S-075	Fig. B.7	Fig. C.8	TU0103	TU0103	Base	1	15	0.81	Vegas (1973, type 63)	1st c. CE

body sherds do not provide clear evidence for open or closed shapes in particular. The rim has a shape comparable to those of amphora excavated in the Old Mauretanian period in the city of Lixus, corresponding roughly to Kably′s mid-Mauretanian III, or the 2nd to 1st century BCE (Aranegui, 2005, 108 fig.1.11). The handle is similar in size and shape to excavated amphora sherds dating to the late Mauretanian/Mauretanian IV period in Lixus, dating to the first half of the 1st century CE (Aranegui, 2005, 129 fig. 22.9). The forms find further comparison with Vegas' amphora type 57, *con borde engrosado*, which is a Roman type of African origin dating to around the 2nd century CE and possibly used for olive oil transportation (Vegas, 1973, 141-3).

Noyes 6 Fabric (N6) is characterized by a light red to reddish orange coloration (5YR8/4 to 5YR7/4). Sixteen sherds belong to this fabric group, weighing 151 grams (see Table 3.2). The variation in color suggests that firing practices varied among vases of the same fabric type. This is a medium coarse fabric with 15% inclusions. Most inclusions are small, white, and angular perhaps calcite or quartzite measuring up to 1 mm in length. One fragment contains a large white translucent angular inclusion, probably of quartzite, ca. 6 mm in length. Several fragments also have irregular reddish-brown angular inclusions ranging from 2 to 5 mm, which may be grog temper or argillaceous rock fragments. Diagnostic fragments consist of four rim sherds as well as one nearly complete flat base. Four rims belong to bowls ranging from ca. 11 cm to 25 cm in diameter. Rim 2017S-007 (fig. B.6) belongs to a small bowl or jar with a rim diameter ca. 11 cm and a wall thickness of 1 cm and has a thin upcurving rim with two horizontal grooves on its exterior. Though no comparable shapes have been found in Lixus, the vessel is similar in size, shape, and decoration to Vegas type 47 (*ollas monoansadas*), a table ware dating from the 1st to 3rd century CE and often found in southern Spain and the Balearic Islands (Vegas, 1973, 110-2). Fragment 2017S-009 (fig. B.5) may belong to a wide-mouthed jar or cup or possibly a cup, with a rim diameter

Table 3.3: Diagnostic fragments of Noyes 8 fabric; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Fragment	Drawing	Photo	Context	Site	Type	n_{fr}	n_w	n_e	Comparanda	Proposed Dates
2017S-021	Fig. B.9	Fig. C.10	TU0060	Duira	Rim	1	15	0.13	Aranegui and Hassini (2010, 122)	5th-3rd c. BCE
2017S-046	Fig. B.8	Fig. C.13	TU0060	Duira	Rim	1	20	0.14	Vegas (1973, type 47)	1st c. BCE
2017S-031	Fig. B.11	Fig. C.12	TU0019	TU0018	Ring Base	1	5	0.06	Aranegui (2005, 89-91)	2nd c. BCE-1st c. CE
2017S-056	Fig. B.10	Fig. C.14	TU0078	TU0076	Ring Base	1	15	0.17	Aranegui (2005, 89-91)	2nd c. BCE-1st c. CE

of 14 cm and a wall thickness of 1 cm and it is also a complex form with two horizontal grooves, perhaps related to Vegas type 26, or *vasitos cónicos con borde engrosado*, a table ware with a wide geographic range that reaches nearby Thamusida from the 1st century BCE to the 1st century CE. The other two rims are undecorated and come from larger bowls or basins, 20 cm (2017S-010; fig. B.4) and 26 cm (2017S-076; fig. B.3) in diameter. Rim 2017S-010 (fig. B.4) has a wall thickness of ca. 3 mm and a thicker, inverted rim of ca. 1.2 cm, with no firm comparison from the Lixus excavation. In contrast, bowl 2017S-076 (fig. B.3) has a wall thickness of ca. 6 mm and a beaded rim which is 1.1 cm thick, with a shallow horizontal groove on the exterior, which finds no direct comparison in the ceramic assemblage from Lixus, but may be compared with Vegas type 5, *cuencos con borde aplicado*, with a chronological range from around the 1st to 3rd century CE (Vegas, 1973, 22-5). The small, flat base 2017S-075 (fig. B.7) is only 6 cm in diameter. Its shape is highly irregular, with a thick wall and base of ca. 1 cm. Its rougher interior surface suggests that it belongs to a closed vessel. No comparable fragments are found in the Lixus excavation, and it is not clear whether it was wheel-made, though there is a possible trace of string cutting on the bottom of the base. The fragment may come from a special vessel imitation such as an unguentarium which was popular in the 1st century CE in North Africa, suggested by its closed shape and unusual form (Hayes 1997, 85-7; Vegas 1973, 150). However, this sherd finds possible comparison with the previously discussed Vegas type 47, or *ollas monoansadas*, and may perhaps be the base of an open vessel similar to 2017S-007 (fig. B.6), despite its rough interior (Vegas, 1973, 110-2). None of the sherds show clear use wear. The bowls would have been a serving or table ware. Despite the rim decorations, the relative coarseness of the fabric and absence of painted decoration indicates a utilitarian function.

Noyes 8 Fabric (N8) is a fine ware, that is mostly characterized by a light red color (2.5YR7/8) (see Table 3.3). It also includes some sherds with grayish pale (7.5YR6/2)

Table 3.4: Diagnostic fragments of Noyes 10 fabric; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Fragment	Drawing	Photo	Context	Site	Type	n_{fr}	n_w	n_e	Comparanda	Proposed Dates
2017S-029	Fig. B.14	Fig. C.16	TU0023	TU0023	Ring Base	1	8	0.16	Aranegui (2005, 89-91)	2nd c. BCE-1st c. CE
2017S-081	Fig. B.12	Fig. C.17	TU0023	TU0023	Rim	1	42	0.13	Aranegui (2005, 109)	2nd-1st c. BCE
									Vegas (1973, type 50)	2nd-1st c. BCE
2017S-087	Fig. B.13	Fig. C.18	TU0053	TU0053	Lid	1	20	0	N/A	N/A

core or color on one side, which is probably due to incomplete oxidation during firing and restriction of oxygen on the interior wall, suggesting a closed vessel. Twenty-three fragments weighing 297 grams belong to this fabric. The inclusion density of this fabric is ca. 2%, and consists chiefly of yellowish-white, rounded particles of maximum 1 mm, which are ostensibly calcite. Rarely there are brown, angular inclusions of about 3 mm, which may be grog temper or argillaceous rock fragments. The four diagnostic fragments of this fabric consist of two rims and two ring bases. The two rims are 2017S-021 (fig. B.9) and 2017S-046 (fig. B.8) and belong to wide-mouthed vessels with everted rims and cylindrical necks, likely jars or bowls, both ca. 16 cm in diameter. Rim 2017S-021 (fig. B.9) is about 1.5 cm thick, and is somewhat similar in shape and thickness to jar rims from the Punic level excavations of Lixus, dating from the 5th to 3rd century BCE (Aranegui and Hassini, 2010, 122). Rim 2017S-046 (fig. B.8) is less than 1 cm thick and is somewhat comparable to Phoenician common ware jars from the city excavation in shape and thickness (Aranegui and Hassini, 2010, 87 fig. 30.1). However, the shape is also quite similar to Vegas type 24, small vases dating to the 1st century BCE and earlier found in nearby Thamusida, though lacking any clear decorative elements common to the type (Vegas, 1973, 64-5). The fragment 2017S-056 (fig. B.10) is a ring base decorated with horizontal ridges. Its base diameter is 14 cm and its maximum wall thickness is 1 cm, which suggests that it may be a jug or bowl of similar vessel form as the rims. The ring base 2017S-031 (fig. B.11) has a diameter of 10 cm, a thickness of 1 cm, and is also decorated with horizontal ridges. It is of the same vessel type as the 2017S-056 (fig. B.10) base, likely a bowl. These ring bases are comparable to local imitations of black gloss pottery in the Mauretanian period from the Lixus excavations (Aranegui, 2005, 89-91). The texture and vessel sizes associated with the fabric suggest a function as a table ware, but the wide range of dates based on form make the hypothesizing of chronology using diagnostic sherds difficult.

Table 3.5: Diagnostic fragments of Noyes 11 fabric; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Fragment	Drawing	Photo	Context	Site	Type	n_{fr}	n_w	n_e	Comparanda	Proposed Dates
2017S-037.1	Fig. B.15	Fig. C.20	TU0018	TU0018	Rim	1	20	0.06	N/A	N/A
2017S-037.2	Fig. B.16	Fig. C.20	TU0018	TU0018	Rim	1	10	0.08	Aranegui and Hassini (2010, 122)	5th-3rd c. BCE
2017S-060	Fig. B.17	Fig. C.21	TU0034	Dhar Taouazza	Rim	1	15	0.05	Aranegui (2005, 89-91)	2nd-1st c. BCE
2017S-103	Fig. B.18	Fig. C.22	TU0101	TU0101	Base	1	19	0.25	Aranegui (2005, 100 fig. 4.10)	2nd-1st c. BCE

Noyes 10 Fabric (N10) is characterized by a reddish buff to reddish orange color (2.5YR6/6 to 2.5YR6/8) (see Table 3.4). Forty fragments weighing 644 grams belong to this fabric, making it the largest group. Few sherds show a color differentiation on one side towards a more buff coloration, suggesting a closed vessel. Most of the fragments do not show this color differentiation, suggesting open shapes, as well as perhaps a high level of control over firing. N10 is a fine fabric, with 1% to 2% inclusions and a medium visible porosity. Inclusions mainly consist of rounded, white and semi-translucent minerals probably calcite and quartzite respectively of no more than 1 to 2 mm in diameter. There are a few examples of argillaceous rock fragment inclusions or possibly grog, as in fabrics N1, N6, and N8. There are three diagnostic fragments: a rim, a ring base, and a possible lid fragment. Rim 2017S-081 (fig. B.12) is undecorated and appears to belong to an open-mouthed vessel with a rim diameter of about 14 cm. The rim is 2 cm thick and tapers towards the body of the vessel, and is somewhat comparable in size and shape to Early Mauretanian amphora rims from Lixus dating to the 2nd or 1st century BCE (Aranegui, 2005, 109). The shape also finds some parallel with Vegas type 50, amphorae found in Spain and France with a similar chronology (Vegas, 1973, 119-22). The ring base 2017S-029 (fig. B.14) has a diameter of 10 cm and is 1 cm thick. It is comparable to local imitations of black gloss pottery from the Mauretanian period of Lixus, like the N8 ring bases (Aranegui, 2005, 89-91). The possible lid fragment 2017S-087 (fig. B.13) has a wall thickness of 1 cm and a maximum diameter of 10 cm, with no parallels from Lixus. There is also a fair amount of use wear in the form of scraping striations on many fragments. These seem to appear on the interior walls of sherds, though this is not always clear. The texture of this fabric, medium size of vessels, and possible lid indicate a serving function for the thin walled fragments. The thicker fragments and possible amphora rim suggest a storage or transport function. This fabric was likely used for multiple functions in vessels of varying form, similarly to N1.

Table 3.6: Diagnostic fragments of Noyes 12 fabric; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Fragment	Drawing	Photo	Context	Site	Type	n_{fr}	n_w	n_e	Comparanda	Proposed Dates
2017S-041	Fig. B.20	Fig. C.24	TU0018	TU0018	Rim	1	3	0.06	Aranegui and Hassini (2010, 117) Aranegui (2005, 167)	5th-3rd c. BCE
2017S-045	Fig. B.19	Fig. C.25	TU0019	TU0018	Rim	1	8	0.05	Aranegui and Hassini (2010, 117) Aranegui (2005, 167)	5th-3rd c. BCE

Noyes 11 Fabric (N11) is reddish buff to light red (2.5YR7/6 to 2.5YR7/8) (see Table 3.5). Six sherds weighing 90 grams belong to this fabric. Fragments show some variation in color on either side, which suggests closed shapes. This is a coarse fabric with 20% inclusions, which are mostly less than 1 mm but may be as large as 3 mm long, and within sherds may include white, rounded elements, rounded black minerals, and reddish angular inclusions that may be grog or argillaceous rock. There are three rims and one flat base. All rims belong to open-mouthed vessels, ranging from a small bowl of 14 cm (fig. B.16) to a basin of 30 cm (fig. B.17). Rim 2017S-060 (fig. B.17) is 30 cm in diameter and 1 cm thick with a shape comparable to those found in Mauretanian common wares in Lixus (Aranegui, 2005, 100 fig. 4.10). Rim 2017S-037.1 (fig. B.15) is 26 cm in diameter with a thickness of ca. 1 cm and is unusual in that it has an interior ridge for a lid, and finds no easy comparison in the ceramic assemblage from Lixus. Rim 2017S-037.2 (fig. B.16) is 14 cm in diameter with a shape similar to N8 fragment 2017S-021 (fig. B.9) though it is thinner at 5 mm thick (Aranegui 2005, 168; Aranegui and Hassini 2010, 122). Flat base 2017S-103 (fig. B.18) has a diameter of 10 cm and is 5 mm thick, similar to local black gloss imitations from the Mauretanian phase (Aranegui, 2005, 89-91). Rim 2017S-060 (fig. B.17) shows a pattern of burning along the top of the rim suggestive of a destruction fire rather than cooking. A functional analysis of this fabric group is difficult, as the diagnostic pieces are suggestive of a variety of uses. The larger vessels are likely storage jars, further suggested by the coarse fabric texture and evidence for a lid. The smaller pieces may instead be local imitations of fine ware for table use.

Noyes 12 Fabric (N12) is characterized by a reddish orange to light red color (2.5YR6/8 to 2.5YR7/8) (see Table 3.6). It is a medium coarse fabric with ca. 10% inclusions. Ten sherds weighing 77 grams belong to N12, making it the smallest group in terms of weight. Overall, the sherds have been fired evenly in an oxidized environment. Some sherds are

Table 3.7: Diagnostic and selected body fragments of Noyes 13 fabric; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Fragment	Drawing	Photo	Context	Site	Type	n_{fr}	n_w	n_e	Comparanda	Proposed Dates
2017S-042	Fig. B.21	Fig. C.28	TU0018	TU0018	Rim	1	24	0.11	Aranegui (2005, 105,128-9)	2nd-1st c. BCE
									Vegas (1973, type 1/1A)	1st c. BCE-1st c. CE
2017S-083	N/A	Fig. C.30	TU0023	TU0023	Body	1	24	0	N/A	N/A
2017S-086	N/A	Fig. C.31	TU0018	TU0018	Body	1	5	0	N/A	N/A
2017S-096	Fig. B.22	Fig. C.32	TU0019	TU0018	Rim	1	16	0.11	Aranegui (2005, 105,128-9)	2nd-1st c. BCE
									Vegas (1973, type 1/1A)	1st c. BCE-1st c. CE

slightly darker, suggesting variation in firing environment between vessels. Mineralogical inclusions are angular and white or dark brown, less than 1 mm in length. Two diagnostic rims belong to this fabric. Both rims (fig. B.20 and fig. B.19) belong to slightly closed vessels, likely small to medium size jars. Rim 2017S-041 (fig. B.20) is only around 9 cm in diameter and is 5 mm thick. The rim has two shallow decorative grooves on its exterior wall. Fragment 2017S-045 (fig. B.19) has a rim diameter of 16 cm and a wall thickness of 1.5 cm. A fragment from 2017S-040 shows burning on one side consistent with a cooking function, though it may be from a destruction fire. Thus, N12 may be a cookware fabric, with a similar shape as Phoenician or Punic period common ware jars from Lixus (Aranegui and Hassini 2010, 117; Aranegui 2005, 167).

Noyes 13 (N13) fabric is characterized by a gray to buff yellowish to reddish yellow color (7.5YR 6/2 to 5YR7/6) (see Table 3.7). This wide variation in color can be attributed to firing, as variation occurs on individual sherds as well as within the group, and mineralogical inclusions are similar across the fragments. Sherds which show reddish yellow on the exterior and gray on the interior suggest a closed vessel shape, resulting in a lack of complete oxidation (cf. 2017S-083, fig. C.30, and 2017S-086, fig. C.31). Buff yellowish sherds were fired in a more reducing atmosphere than those which show a reddish yellow color. Fifteen sherds weighing 180 grams belong to this fabric. N13 is a coarse fabric with 20% to 25% inclusions. This fabric contains the most variety of mineralogical inclusions on individual sherds, white, black, brown, and red in color. These inclusions range from less than 1 mm to 3 mm long, and may be rounded or angular. White inclusions are calcite and brown and red inclusions may be grog or argillaceous rock. The two N13 diagnostic sherds are rims (fig. B.21 and fig. B.22). The rims are from jars ranging from 14 cm to 18 cm in diameter. The rim 2017S-096 (fig. B.22) is a complex shape with one groove running under the lip of the fragment on

Table 3.8: Description of each fabric type.

Fabric	Texture	Color	Characteristics	Forms	Comparanda	Proposed Dates
Noyes 1	3%	Buff to reddish yellow 5YR7/6 to 5YR7/8	Interior buff self-slip Calcite inclusions (< 3 mm) Argillaceous rock inclusions (< 4 mm)	Amphora	Aranegui (2005, fig. 1.11, 22.9) Vegas (1973, type 57)	1st c. BCE to 2nd c. CE
Noyes 6	15%	Light red to reddish orange 5YR8/4 to 5YR7/4	Variations in firing Calcite inclusions (< 1 mm) Few quartzite inclusions (6 mm) Argillaceous rock inclusions (2 – 5 mm)	Pot Bowl Cup Unguentarium	Vegas (1973, type 47) Vegas (1973, type 5) Vegas (1973, type 26) Vegas (1973, type 63)	1st c. BCE to 3rd c. CE
Noyes 8	2%	Light red to gray (core) 2.5YR7/8 to 7.5YR6/2	Incomplete oxidation Calcite inclusions (< 1 mm) Argillaceous rock inclusions (< 3mm)	Ring base bowls Jar Vase	Aranegui (2005, 89-91) Aranegui and Hassini (2010, fig. 30.1) Vegas (1973, type 24)	3rd c. BCE to 2nd c. CE
Noyes 10	1% – 2%	Reddish buff to reddish orange 2.5YR6/6 to 2.5YR6/8	Quartzite inclusions (1 – 2 mm) Calcite inclusions (1 – 2 mm) Argillaceous rock inclusions (< 1 mm)	Amphora Ring base bowl	Aranegui (2005, 109) Vegas (1973, type 50) Aranegui (2005, 89-91)	2nd c. BCE to 1st c. CE
Noyes 11	20%	Reddish buff to light red 2.5YR7/6 to 2.5YR7/8	Black micaceous inclusion (2 – 3 mm) Argillaceous rock inclusions (1 – 3 mm) Calcite inclusions (1 – 3 mm)	Jar Bowl	Aranegui (2005, fig. 4.10) Aranegui (2005, 168) Aranegui and Hassini (2010, 75)	2nd c. BCE to Late antiquity
Noyes 12	10%	Reddish orange to light red 2.5YR6/8 to 2.5YR7/8	Some burning Calcite inclusions (< 1 mm) Argillaceous rock inclusions (1 – 2 mm)	Jar	Aranegui and Hassini (2010, 117) Aranegui (2005, 167)	3rd c. BCE to 2nd c. CE
Noyes 13	20% – 25%	Buff yellowish to reddish yellow 7.5YR6/2 to 5YR7/6	High level of variation in firing Black micaceous inclusions (1 – 3 mm) Calcite inclusions (< 2 mm) Argillaceous rock inclusions (1 – 3 mm)	Jar Pot	Aranegui (2005, 105,128) Vegas (1973, type 1)	2nd c. BCE to Late antiquity

the exterior. It has a wall thickness of 6 mm and a rim diameter of 14 cm, and shows some interior diagonal scraping. Rim 2017S-042 (fig. B.21) is also a complex shape, with two deep grooves running along the exterior. It is 1 cm thick and has a rim diameter of 18 cm. The exterior of the rim has an irregular lump of clay ca. 1 cm in diameter which was applied after initial formation, as the grooves run underneath it continuously. It may be a worn handle attachment or a production mistake, but does not seem to be repairing a crack. There is little other use wear on the fragments. The shapes and vessel sizes are similar to common ware and amphora rims from the middle and late Mauretanian period in Lixus, though no direct comparison can be made (Aranegui, 2005, 105,128-9). The rims are similar to Vegas type 1 and 1A shapes, cooking pots dated to the 1st century BCE and 1st century CE, reinforcing this chronology for the vessel forms (Vegas, 1973, 11-5).

3.3 Discussion

The vessel forms of fabrics in this study find many parallels in typologies established for the western Mediterranean, as well in the ceramics excavated in Lixus. A chronology based

purely on form is difficult in common ware studies, as these wares often use the same shapes for centuries (Gliozzo et al., 2009). For this reason, it is important to also utilize chronologies of associated fine wares and amphorae within the same survey contexts, which may be more confidently dated according to form and fabric.

Common ware often exhibits variation in manufacturing both within and among groups, particularly in terms of firing, and most of the fabric groups discussed here follow this pattern. However, N1 and N10 sherds exhibit very little variation of color within their fabric groups. The sherds in these groups display other similar characteristics, including low inclusion presence and the most porosity of all the sherds, and share possible calcite and argillaceous rock inclusions, though N10 also contains quartzite, and overall exhibits smaller mineralogical inclusions. Also, diagnostic sherds from both types suggest a transport function, perhaps as amphorae, though both fabrics also were likely used for serving and table wares, suggested by the presence of smaller and thinner vessels, especially in the N10 assemblage. Furthermore, rim comparisons suggest a similar chronology, overlapping in the 1st century BCE to the 1st century CE. The sites at which the fabrics were found, judging from assocated dateable ceramic finds, all seem to predate late antiquity, though it is important to note that little to no dateable comparanda exists for this region for the 6th and 7th centuries CE. The overwhelming majority of sherds of both fabrics were recovered from sites with ceramics dating no earlier than the late to mid-2nd century BCE. Moreover, both fabrics appear in sites with a relatively heavy presence of Dressel 7-11 amphora (Duira) and Dressel 1 amphora (Dhar Taouazza), dating to around the 1st century CE and 1st century BCE, respectively.

Fabrics N1 and N10 are quite similar, but variation in coloring from buff to orange and the inclusion of quartzite in the N10 sherds may suggest similar but distinct clay sources for the types or otherwise slight variation in processing (though the inclusion of quartzite is likely not a temper, and probably an effect of clay sourcing). This may indicate either change over time as a result of new generations of potters in the same tradition, or two separate traditions of potters working contemporaneously in the region. The former of these hypotheses may be more likely, due to the overlapping distribution of the fabrics, but it should not be assumed that competition could not have existed in the region between potter workshops, especially in the period of the 1st centuries. These fabrics are most associated with amphora, and

thus their even firing perhaps suggests that amphora production was more standardized in this period than the production of table wares, as the remaining fabrics all exhibit much more variation in firing practices. The use of these fabrics as both tableware and amphora is noteworthy. As discussed in the following chapter, these fabrics are distributed along the coast in way that might suggest importation of amphora. If this is the case, then it would imply importation of associated table ware of the fabrics as well. Common ware is often characterized overwhelmingly by local production, but this possible evidence of importation instead illustrates the more complicated nature of common ware production and trade. This hypothesis may be tested through petrographic thin section analysis to associate ceramics with either local or foreign clay compositions and mineralogical inclusions.

The N8 sherds are also a fine ware but seem to serve an exclusively table ware function, suggested by the thinness of the associated rims, as well as the presence of fine ring bases. They also include fragments of calcite and argillaceous rock, but their reddish coloration and inconsistent oxidation sets them apart from the N1 and N10 fabrics in terms of firing. Some of the sherds exhibit gray coloring either externally or in their core. This suggests that the firing of these sherds was not controlled for oxidation, and over various firings the ceramics were unevenly oxidized, due to either an abutting object or, in the case of the sandwiched fabric coloring, a lack of sufficient air flow for full oxidation. This method of incomplete oxidation may perhaps be an intentional stylistic choice, but the lack of consistency suggests that if it was, the process was not well standardized. The diagnostic pieces in this group suggest a date preceding the 1st century BCE, and the majority of dateable ceramics in sites associated with this fabric predate the mid-2nd century CE. However, with the exception of one site, Duira, the fabric is found nowhere in association with ceramics dating earlier than the early 2nd century BCE, though the form of some diagnostic sherds suggest an earlier date, especially the associated ring bases. These ring bases seem to be local imitations, in shape if not decoration, of black gloss pottery which would not be out of place in a 2nd or 1st century BCE context, during a period of increased interregional trade and connectivity between Mauretania and the rest of the Mediterranean. However, associated survey ceramics along with diagnostic analysis does not support this chronology. Notably, the N10 group contains the only other ring base, and it is possible that these imitations were created in

multiple fabrics, and perhaps over an extended period of time, although the chronologies of fabrics N8 and N10 are possibly contemporaneous in the 1st century BCE and 1st century CE.

Fabric N13 sherds exhibit much wider variation in terms of inclusions, ranging from calcite, to quartz, argillaceous rock, and black inclusions that may be mica. The only other fabric which contains this black inclusion is N11, which also displays calcite and argillaceous rock of approximately the same size as N13, 1 to 3 mm long. These two groups are the coarsest, with over 20% inclusions, and both have shapes similar to those found in the Mauretanian phase in the 1st century BCE and are found in context with ceramics ranging in date from the early 2nd century BCE to late antiquity. Unlike N1 and N10, these fabrics see little overlap in distribution, as they are only found together in the site TU0018, with ceramics only dating as early as ca. 120 BCE, but an overwhelming number of wares which date to the 1st century CE and later. The fabrics N11 and N13 may not be pinned to a chronology anymore specific than between the 2nd century BCE and the 5th century CE, but their unique inclusion of a black mineral not seen elsewhere in these common wares is noteworthy. With further survey and ceramic collection, a more firm chronology may be able to illuminate the way clay exploitation changed over time in the Loukkos River valley, and whether or not this can be tied to external influence, such as the role of the Romans in Mauretania, or rather to internal factors that have not yet been fully examined.

The N12 fabric is also a medium coarse ware, perhaps used as cookware, though no sherds exist with clear evidence of burning associated with cooking, and thus the sherds may just as well have served as table or serving ware. Rim shapes associated with this fabric recall Punic/Mauretanian II shapes, but N12 sherds have not been found in a survey context with any ceramics dating to this early period, and rather in contexts dating from the late 2nd century BCE up until the 5th century CE. It should be noted that a significant amount of N12 sherds come from the site TU0015, with no dateable ceramics, although it contains N10 fabric sherds, which as previously mentioned seem to predate the 2nd century CE. The sherds overall seem to have seen even firing compared to the other fabrics, with little discoloration between and within them, though poor preservation makes this difficult to assess. Inclusions seem to consist mostly of calcite, with dark brown inclusions that may

be grog tempering, which would support a function as cookware. However, the sherds in this fabric are poorly preserved and overall discolored due to post-depositional wear, making close analysis of mineralogical inclusions more difficult.

The N6 fabric, as suggested by vessel sizes and shapes, served as a table ware, although with a medium coarse texture. Inclusions mostly consist of small pieces of calcite, and the fabric varies in color due to firing. Diagnostic sherds find comparison in types from the 1st century BCE onward, suggesting the fabric does not precede this date. Thus this fabric may be dated to the Mauretanian IV or early Roman period, and this date may be supported by the possible presence of an *unguentarium*, which were special vessels most popular in clay in the 1st century CE as an imitation of Roman elite lifestyle, and by the 2nd century CE were chiefly made of glass (Hayes, 1997, 85). Sherds of this fabric chiefly were found in TU0018, a site with a high proportion of African Red Slip and African Cookware, both dating no earlier than the late 1st century CE, though these types are in use until the late antique period in Mauretania. This association further supports the hypothesis that the N6 fabric dates no earlier than the 2nd century BCE, though perhaps as late as the 3rd century CE.

Chapter 4

Distribution

4.1 Spatial Distribution

Noyes 1 Fabric (N1) makes up 18% of the total sample of ceramics in this study and consists of 34 sherds weighing 321 grams. It was chiefly found in TU0018 about 2.5 km northeast of Lixus, which produced 136 grams of N1 pottery. About 1 km to the south of TU0018 at the site Dhar Taouazza, a small amount of this fabric was recovered, and with the exception of these two sites, none of the N1 fabric was found to the east of Lixus. The only site which produced this fabric further south than Dhar Taouazza is Duira, at the northeast base of the Choumis hill, where the smallest amount of N1 sherds were recovered. The bulk of N1 sherds, outside of TU0018, were found to the west of the city. Directly to the west of Duira, TU0080 and TU0083 yielded another small amount of the fabric. Interestingly, none of the fabric is found in the survey area for approximately 5 km to the north of this cluster of sites until it reappears in high quantities in sites on the Atlantic coast. The southernmost of these two sites, TU0076, yielded 57 grams, second only to TU0018, whereas the site Legaadi just to the north yielded 54 grams.

Noyes 6 Fabric (N6) has 16 sherds weighing 141 grams, comprising 8% of the total ceramics collected. This fabric again was found mostly in TU0018, 2.5 km northeast of Lixus, which produced 98 grams of N6 ceramics. Notably, a small amount of N6 fabric sherds were recovered from the site Doaur Dhayriya, nearly 8 km south of the city, making it one of only two fabrics found south of the Loukkos. Just to the northeast of Lixus, Duira

produced the least amount of N6 sherds, with only 5 grams. Just under 4 km north of Lixus, TU0103 yielded the second most N6 ceramics, weighing 33 grams. This final site is located just slightly east of Lixus, while all others lie to the west, with a north-south distribution along a narrow longitude.

Noyes 8 Fabric (N8) is the third most abundant type recovered in the survey, with 23 fragments weighing 292 grams, comprising about 16% of the total collection weight. The majority of the N8 ceramics come from Duira, just northeast of Lixus at the base of the Choumis hill. Under 2 km to the north of this site, Sidi Khayri produced the second most N8 sherds, weighing 59 grams. Most sites which produced are concentrated around Lixus, with TU0076 far to the northwest and TU0102 about 4 km to the north being outliers, and producing 28 grams and 27 grams of the fabric, respectively. The remaining sites near Lixus, TU0033, TU0082, and TU0083 together only produced 22 grams. This fabric was also found at TU0018, although only 10 grams was recovered from this site, far below all other fabric weights from the site.

Noyes 10 Fabric (N10) is the most plentiful type found during survey, with 40 sherds weighing 644 grams accounting for nearly 37% of the total sherds collected, and is also the most widespread. The majority of N10 sherds, weighing 190 grams, were found in TU0023, about 5 km north of Lixus. N10 was the only fabric besides N6 found to the south of the city and Douar Dhayriya, almost 8 km to the south, yielded 132 grams, making it the second most abundant site. About 4 km further south, another small amount of the fabric was recovered from TU0053. To the northeast of the city, three more sites yielded ceramics of the N10 fabric: Dhar Taouazza producing 14 grams, TU0015 producing 34 grams, and TU0018 producing 98 grams. Adjacent to Lixus, the sites of Duira and TU0082 yielded very little of the N10 fabric, with only 10 grams collected between both sites. As the distribution of the fabric extends to the north and along the coast, the sites of Sidi Khayri and TU0052 all yielded small amounts of N10 ceramics, 29 grams and 7 grams, respectively. However, similarly to N1, the coastal site TU0076 produced a relativley large amount of N10 ceramics, weighing 110 grams, and making it the third most abundant site.

Noyes 11 Fabric (N11) is the second smallest collection of fragments with 6 sherds weighing 90 grams, making up 5% of the total assemblage. The majority of this fabric came

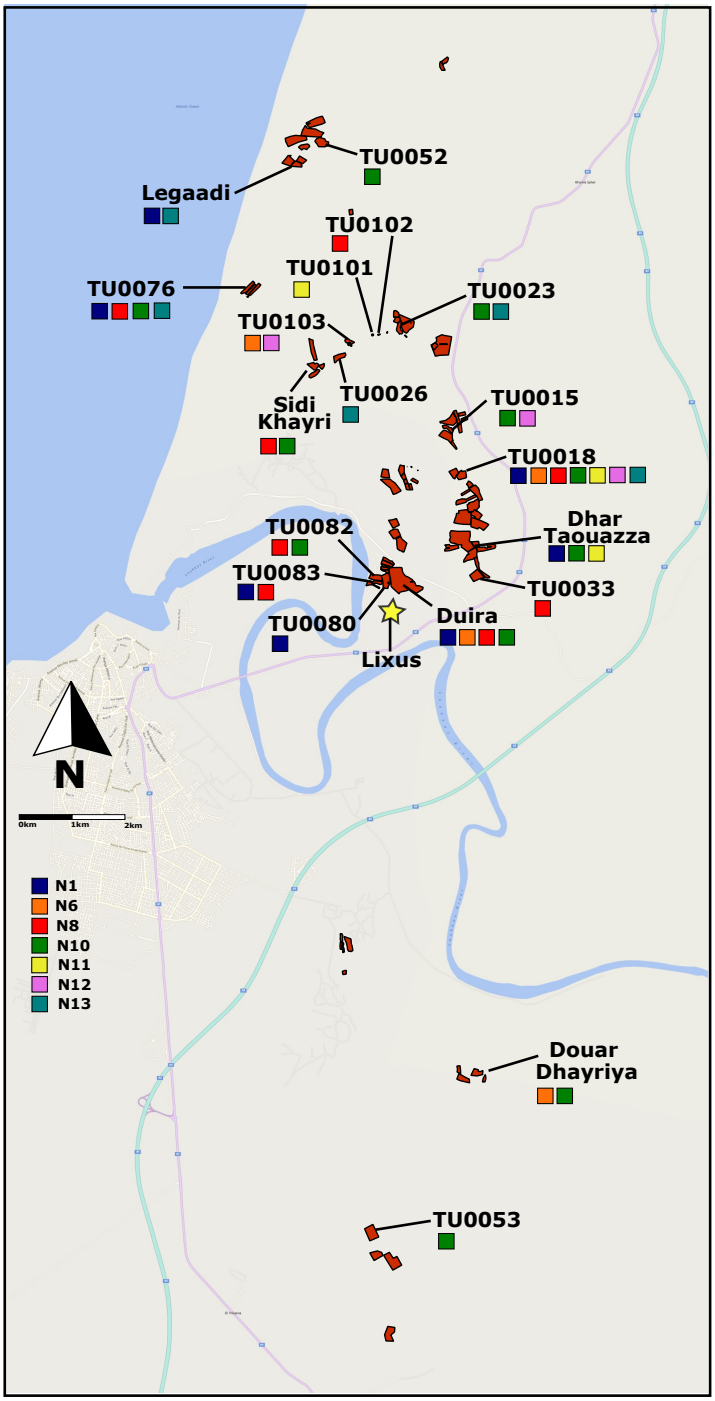

Figure 4.1: Map of fabric presence.

from Dhar Taouazza to the east of Lixus, which yielded 37 grams. TU0018, 2.5 km northeast of Lixus, in which every fabric was found, produced another 34 grams. The remaining 19 grams of N11 sherds were recoverd from TU0101, about 4 km to the north of Lixus.

Noyes 12 Fabric (N12) is comprised of 10 sherds weighing 76 grams, making it the smallest group, only 4% of the total collection. The majority of this ceramic material was again recovered from TU0018, 2.5 km northeast of Lixus. This site yielded 34 grams of this fabric. The second most N12 plentiful site was TU0015, around 4 km north of the city, which produced 26 grams. Finally, TU0103 yielded another small amount of this fabric, weighing 17 grams.

Noyes 13 Fabric (N13) has 15 sherds weighing 180 grams, making up 10% of the collected ceramics. Most of the ceramic material of this fabric was recovered from TU0018, which produced 99 grams of this fabric. Two other sites in which the fabric was found are TU0023 and TU0026, sites only about 1 km apart and 4 km north of Lixus. TU0026 is further east and yielded only 6 grams, whereas TU0023 in the west yielded 24 grams. The remaining N13 sherds come from sites further to the north, along the coast: TU0076 and Legaadi. TU0076 produced the second most amount of this fabric at 46 grams. At Legaadi, only 5 grams of this fabric was collected.

4.2 Discussion

4.2.1 Fabric Distribution

The distribution of the N1 fabric indicates that it was in use along the northwest coast, and was likely transported from there to the area directly around Lixus and especially at TU0018 where every fabric of ceramic appears. This amphora fabric may have contained some sort of coastal resource, such as *salsamenta* or *garum*, for transport to the city and area surrounding it. No sherds of this fabric appear between the coast and sites directly around the Choumis hill, suggesting there was not a center of trade in this area between the coast and TU0018, from which this ceramic may have been redistributed.

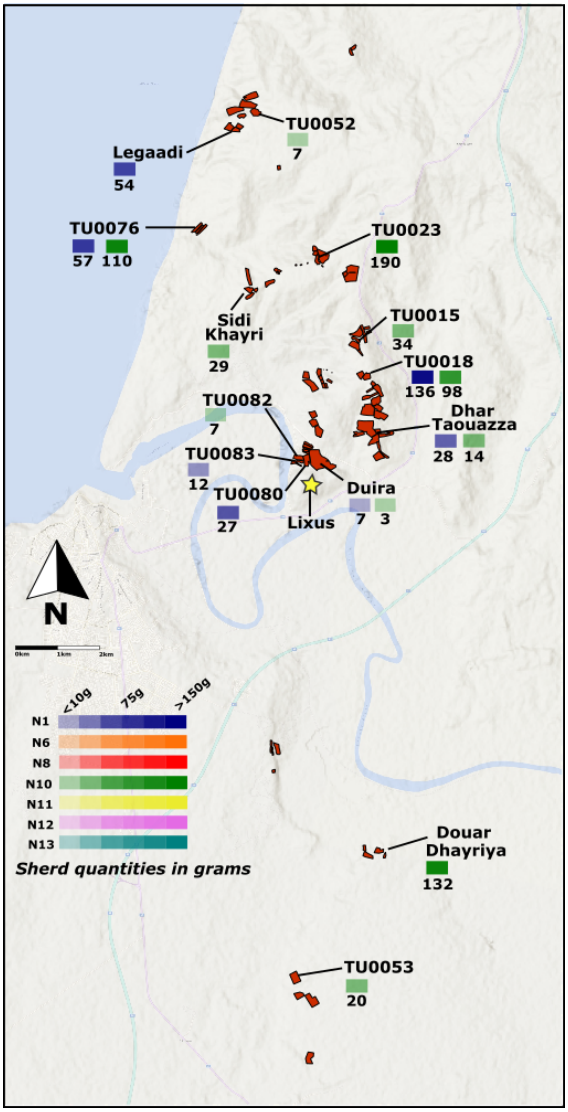

Figure 4.2: Distribution of N1 and N10.

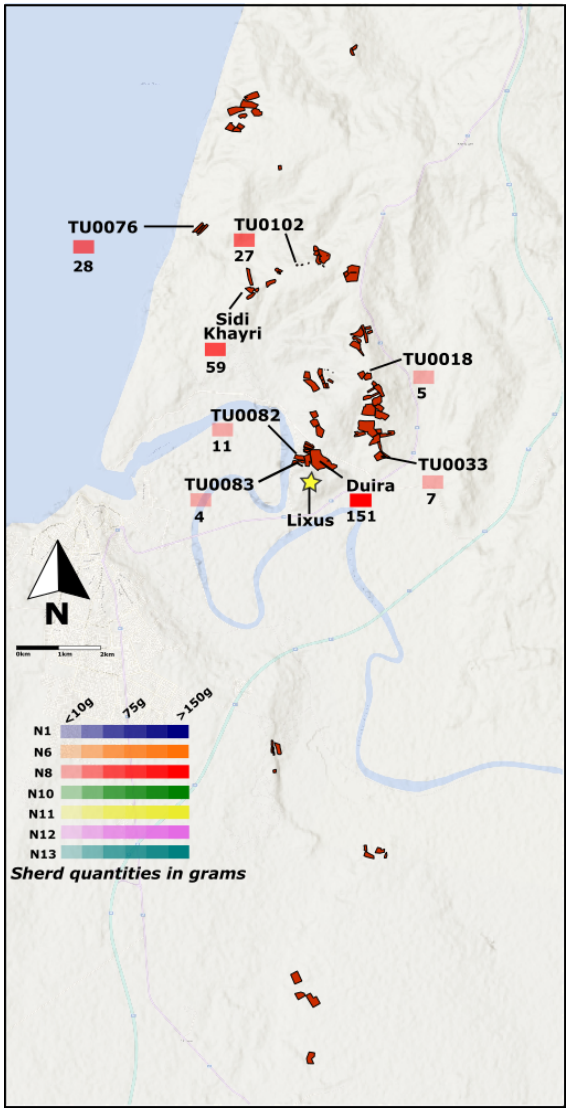

Figure 4.3: Distribution of N8.

The most widely distributed fabric is N10 and is found at the northernmost and southernmost sites under study, TU0052 and TU0053, respectively, as well as those furthest east and west, Dhar Taouazza and TU0076, respectively. The most abundant sites are also widespread, with TU0023 around 4 km north of Lixus, and Douar Dhayriya nearly 8 km south of the city. Interestingly, unlike N8, the N10 fabric is not concentrated around Lixus, only found at 3 sites within a kilometer of the city, and there in below average quantities. Simulations by Brughmans and Poblome (2016) have suggested that a widespread distribution such as this is likely due to increased demand or number of traders, and its presence far to the south of the city may suggest increasing populations in that region. The role of increased intergration with the regional market centered at Lixus is likely not as significant a factor in this distribution, further suggested by the lack of N10 near the city (Brughmans and Poblome, 2016). Forms of this fabric include both transport and table ware, and its popularity perhaps indicates that the production of N10 vessels was centered on a single workshop, which produced ceramics for much of the rural region around Lixus, suggestive of more intraregional integration than may be expected. The distribution of this fabric overlaps some with fabric N1, notably in that they are both found near the coast in high quantities and in relatively low amounts near the city. There presence in widely dispersed rural sites suggests connectivity in the area, and it would be worthwhile to investigate these sites for evidence of ancient roads (see fig. 4.2).

The N6 fabric is found more at TU0018 than any other site, with only single sherds found at Duira, TU0103, and Douar Dhayriya (see fig. 4.5). This again suggests that TU0018 is some sort of hub for ceramic trade or production, though no evidence of production has yet been uncovered in this area. The distribution of this fabric largely falls to the east of Lixus (though TU0103 is very slightly to the northwest). This may suggest that the local production of this fabric is coming from the region to the east of TU0018 further inland, rather than the coast like the N1 and N10 fabrics.

N8 is the second most widespread fabric studied, with only N10 found at more sites (see fig. 4.3). The distribution of the fabric concentrates around the city in sites TU0082, TU0083, Duira, and TU0033. This fabric was also found at TU0018, as all other fabrics were. However, the N8 fabric was the least recovered from this site, with only 2 sherds

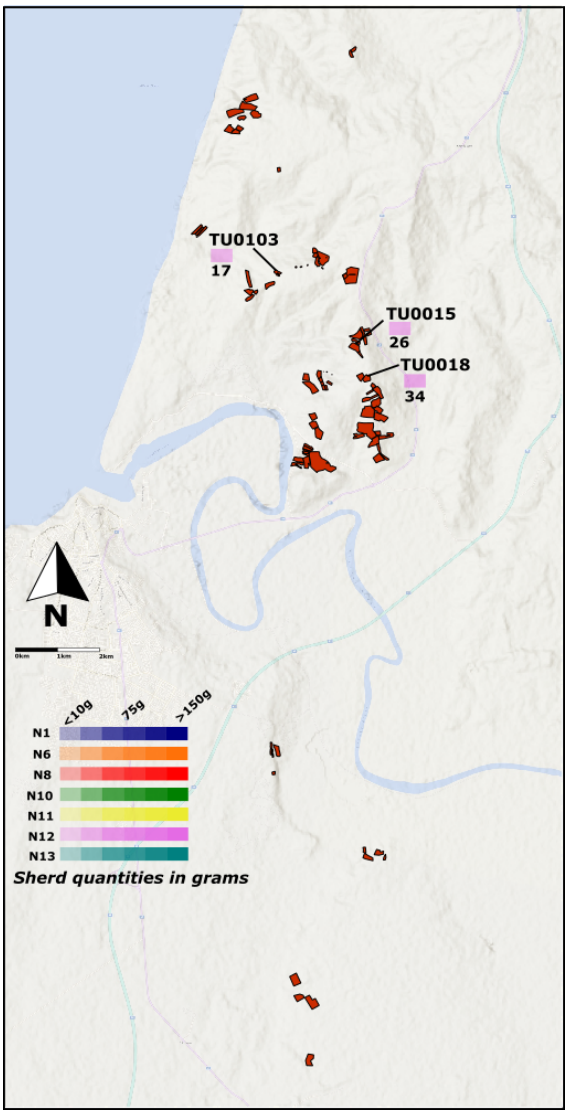

Figure 4.4: Distribution of N12.

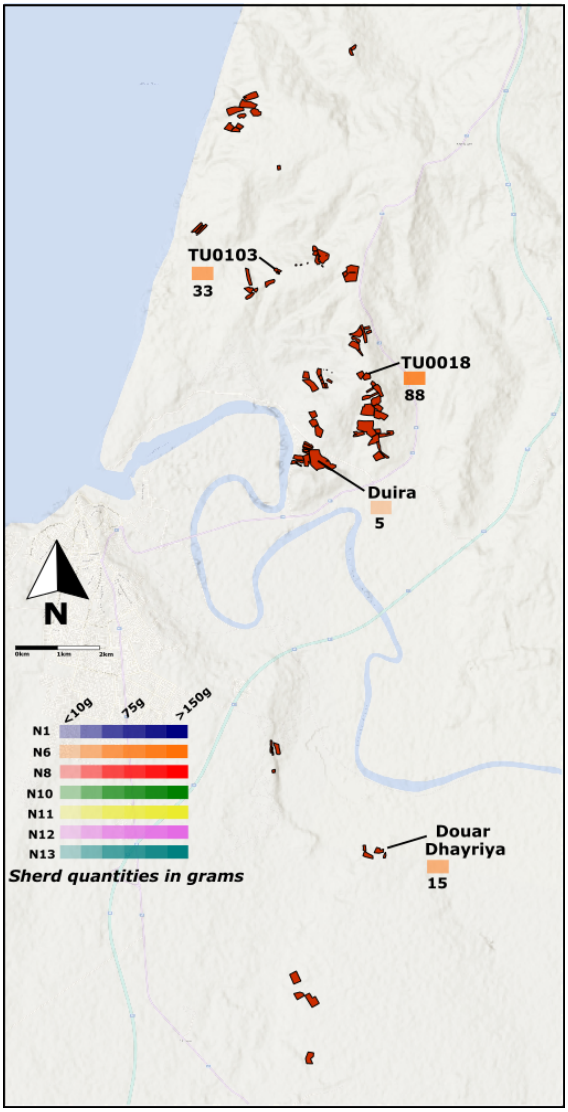

Figure 4.5: Distribution of N6.

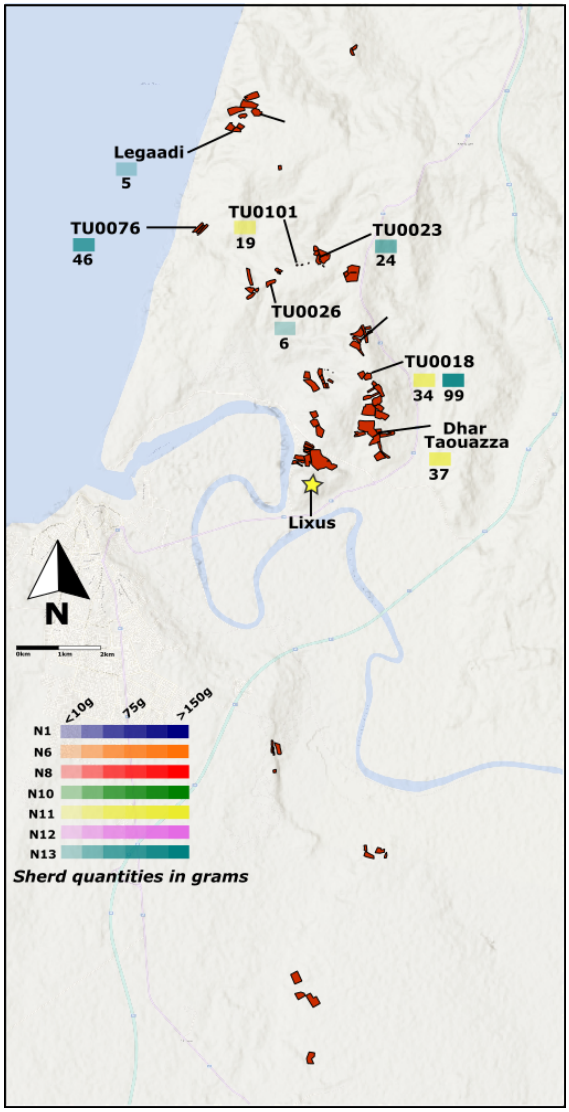

Figure 4.6: Distribution of N11 and N13.

weighing 5 grams, as compared to the nearly 500 grams of common ceramic from the site. Widespread distribution such as this fabric has is perhaps attributed to increased demand as suggested by computer simulations by Brughmans and Poblome (2016). Thus it seems that this fabric, one of the fine tablewares, was in demand at some point in the region around Lixus, concentrated near the city itself.

The fabrics N11, N12, and N13 have a similar distribution, restricted to sites to the north of the city, no further than 6 km away, with the exception of N13 which is found near the coast. The majority of all three fabrics come from TU0018. Similarly to N6, distribution of N11 and N12 does not go far west of Lixus, perhaps indicating that they are originating further to the east, and coming from the hinterland via TU0018, and then distributed to other sites in the area (see fig. 4.4 and fig. 4.6). The N13 fabric is again found at TU0018 in above average quantities, but no further south than this, including the vicinity of Lixus. It is possible that this fabric is originating near the coast, with a wider distribution in coastal sites TU0076 and Legaadi in the northwest, and very little recovered from sites between these and TU0018. The unique black inclusions of this fabric are similar to those of the N11 fabric, indicating a similar source of clay, but their distribution and other inclusions indicate different workshops with different regions of demand (see fig. 4.6).

4.2.2 Significant Sites

It is evident that TU0018 is a significant site, since it contains sherds of every fabric, and often in relatively large quantities. This site was likely a center of ceramic trade and redistribution rather than production, as many of these fabrics seem to be the products of different workshops based on firing practices and raw materials used. More investigation of the region around this site will further clarify whether or not any pottery workshops existed in the area. Fabrics which had a transport function, N1 and N10, see wider distribution from this site, which may be expected. N10, however, seems to have been in much higher demand than N1, and if these fabrics were being produced in a similar time frame, as suggested by their preliminary chronology, may have been products of competing workshops. Table and serving wares also seem to be concentrated at TU0018, and from there have mostly limited geographical ranges, either remaining east of the city or northwest, near the coast, suggesting

Table 4.1: Presence/Absence of fabrics by site.

Site		Noyes 1	Noyes 6	Noyes 8	Noyes 10	Noyes 11	Noyes 12	Noyes 13
HESP-1	Duira	x	x	x	x			
HESP-2	Dhar Taouazza	x			x	x		
HESP-3	TU0018	x	x	x	x	x	x	x
HESP-5	Sidi Khayri			x	x			
HESP-7	TU0076	x		x	x			x
HESP-8	TU0103		x				x	
HESP-9	TU0101					x		
HESP-10	TU0102			x				
HESP-11	TU0023				x			x
HESP-12	Legaadi							x
HESP-14	Douar Dhayriya		x		x			

Off Site Collection	Noyes 1	Noyes 6	Noyes 8	Noyes 10	Noyes 11	Noyes 12	Noyes 13
TU0015				x		x	
TU0026							x
TU0033			x				
TU0052				x			
TU0053				x			
TU0080	x						
TU0082			x	x			
TU0083	x		x				

that may have emanated from this site. N8 is the only fabric for which this may not hold true, due to its quite low presence at TU0018. This may be due to its popularity around, and perhaps within, Lixus, and thus its limited need to be transported elsewhere for trade. It is also be important to note that this site exhibits no ceramics dateable to before the late 2nd century BCE, suggesting that none of the fabrics may predate this period.

The two main sites on the northwest coast of the survey area are Legaadi and TU0076. The presence of amphora fabrics at these sites suggest that this was perhaps a location of importation and exportation. The use of amphora fabrics N1 and N10 in table ware vessels as well is significant in this regard. Petrographic analysis is necessary to determine whether these fabrics were import or export products, and thus foreign or local ceramics. If foreign, evidence for the importation of common table ware ceramics would be significant in altering perceptions of the role of common ware in large scale interregional trade.

Table 4.2: Fabrics per Site; n_{fr} refers to number of sherd fragments; n_w refers to weight of sherds; n_e refers to estimated vessel equivalent.

Site		Fabric	n_{fr}	n_w	n_e
HESP-1	Duira	N1	1	7	0.00
		N6	1	5	0.00
		N8	12	151	0.27
		N10	1	3	0.00
HESP-2	Dhar Taouazza	N1	2	28	0.00
		N10	2	14	0.00
		N11	2	37	0.05
HESP-3	TU0018	N1	22	136	0.03
		N6	13	88	0.23
		N8	2	5	0.06
		N10	6	98	0.00
		N11	3	34	0.14
		N12	6	34	0.11
		N13	9	99	0.22
HESP-5	Sidi Khayri	N8	2	59	0.00
		N10	2	29	0.00
HESP-7	TU0076	N1	3	57	0.00
		N8	2	28	0.17
		N10	4	110	0.00
		N13	3	46	0.00
HESP-8	TU0103	N6	1	33	0.81
		N12	2	17	0.00
HESP-9	TU0101	N11	1	19	0.25
HESP-10	TU0102	N8	2	27	0.00
HESP-11	TU0023	N10	11	190	0.29
		N13	1	24	0.00
HESP-12	Legaadi	N1	4	54	0.00
		N13	1	5	0.00
HESP-14	Douar Dhayriya	N6	1	15	0.06
		N10	7	132	0.00

Off Site Collection		Fabric	n_{fr}	n_w	n_e
	TU0015	N10	3	34	0.00
		N12	2	26	0.00
	TU0026	N13	1	6	0.00
	TU0033	N8	1	7	0.00
	TU0052	N10	1	7	0.00
	TU0053	N10	1	20	0.00
	TU0080	N1	1	27	0.00
	TU0082	N8	1	11	0.00
		N10	1	7	0.00
	TU0083	N1	1	12	0.00
		N8	1	4	0.00

Chapter 5

Conclusions

The major goals of this study were to create a preliminary fabric typology of common wares in the Loukkos River valley, to associate these fabrics with a preliminary chronology, and to perform a distribution analysis of fabrics in the river valley surrounding the city of Lixus. The fabric typology presented in this study made use of macroscopic analysis of clay inclusions to distinguish ceramics produced by the same workshop. This has provided a preliminary understanding of the standardization of common ware and amphora production in the region, which seems to exhibit heightened standardization in fabrics N1 and N10, which are associated with amphorae shapes indicative of the 1st century BCE and CE. However, the remaining common ware fabrics instead do not seem to exhibit standardization in firing or raw material use. Certain fabrics - N11 and N13 - exhibit unique black mineralogical inclusions. The significance of this inclusion has not been elucidated in this study, due to small sample size and lack of petrographic analysis. In the future, petrogrpahic thin sampling may illuminate the nature of these black inclusions, and ideally will be useful in associating these fabrics with specific clay beds in the Loukkos River valley.

The fabric typology created in this study is tied to a preliminary chronology, developed primarily through comparison with established dateable common ware typologies and stratigraphically excavated ceramics from Lixus. This chronology is further substantiated by a fabric's association with dateable finewares and amphorae in a systematic survey context. Certain fabrics - especially N1 and N10 - can be dated with some confidence to around to 1st century BCE and 1st century CE, and this chronology may be further supported through

future stratigraphic excavation of sites in the Loukkos River valley. Most other fabrics seem to date no earlier than the 3rd century BCE, though some fabrics see a few earlier parallels. Although no fabrics seem to date later than the 6th century CE, it is important to note that no available common ware typologies exist for this region from the 6th to 8th centuries CE. Future study of common wares in the Loukkos River valley, especially in stratigraphic contexts, will undoutedbly strengthen the certainty of these preliminary fabric chronologies.

A distribution analysis of these fabrics has suggested some interesting, though provisional, trends regarding the integration of the intraregional economy in the Loukkos River valley. The presence of every fabric at TU0018 and the possibility of this location as a center of trade indicates that the countryside around Lixus was relatively integrated in terms of economic activity, and was likely involved with trade further to the east as well. As exploration of the area between Lixus and Oppidum Novum to the east continues, a clearer picture of the extent of economic integration may appear. The distribution of fabrics N1 and N10, with both amphora and table and serving ware forms, perhaps suggests importation, which would prove significant in altering the common perception of these forms as local products. However, only petrographic thin section analysis may prove this, as at the macroscopic level these fabrics are not out of place in the clay composition of the river valley.

This study was performed on a limited set of common ceramics collected as part of a systematic survey, and the analysis of these ceramics has proved fruitful in a number of ways, despite the common conception that common wares do not lend themselves to useful analysis. In future research of common ware in the Loukkos River valley, a petrographic analysis and subsequent association of fabrics to specific clay beds as well as a firmer dating of fabrics through stratigraphic excavation are paramount, and will serve to further substantiate the preliminary typology produced in this study. These fabric groups should also be tested in future survey and excavation to assess the utility of these groups in sorting common ware from the region.

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Appendices

A Concordance of Study Lots with Accession Lots

Table A.1: Concordance of Study Lots with Accession Lots.

Study Lot	TU	Fabric	Accession Lot	Site Name	SYS/GRAB
2017-S-001	0018	N1	2016-018	TU0018	SYS
2017-S-002	0019	N1	2016-022	TU0018	SYS
2017-S-005	0019	N1	2016-007	TU0018	GRAB
2017-S-006	0019	N1	2016-022	TU0018	SYS
2017-S-007	0018	N6	2016-020	TU0018	GRAB
2017-S-008	0019	N6	2016-018	TU0018	SYS
2017-S-009	0019	N6	2016-023	TU0018	SYS
2017-S-010	0019	N6	2016-022	TU0018	SYS
2017-S-011	0018	N1	2016-019	TU0018	SYS
2017-S-012	0018	N6	2016-018	TU0018	SYS
2017-S-013	0018	N13	2016-018	TU0018	SYS
2017-S-014	0019	N13	2016-022	TU0018	SYS
2017-S-016	0019	N1	2016-022	TU0018	SYS
2017-S-018	0075	N13	2016-093	Legaadi	SYS
2017-S-019	0018	N6	2016-019	TU0018	SYS
2017-S-020	0018	N6	2016-019	TU0018	SYS
2017-S-021	0060	N8	2016-067	Duira	SYS
2017-S-022	0059	N8	2016-069	Duira	SYS
2017-S-023	0058	N8	2016-070	Duira	SYS
2017-S-024	0059	N8	2016-069	Duira	SYS
2017-S-025	0061	N8	2016-075	Duira	SYS
2017-S-026	0018	N8	2016-018	TU0018	SYS
2017-S-027	0023	N10	2016-035	TU0023	SYS
2017-S-028	0018	N10	2016-022	TU0018	SYS
2017-S-029	0023	N10	2016-036	TU0023	GRAB
2017-S-030	0019	N10	2016-023	TU0018	SYS

Table A.1 – continued from previous page

Study Lot	TU	Fabric	Accession Lot	Site Name	SYS/GRAB
2017-S-031	0019	N8	2016-023	TU0018	SYS
2017-S-032	0019	N10	2016-023	TU0018	SYS
2017-S-033	0019	N10	2016-022	TU0018	SYS
2017-S-037	0018	N11	2016-021	TU0018	GRAB
2017-S-038	0019	N11	2016-007	TU0018	GRAB
2017-S-039	0019	N1	2016-023	TU0018	SYS
2017-S-040	0018	N12	2016-019	TU0018	SYS
2017-S-041	0018	N12	2016-021	TU0018	GRAB
2017-S-042	0018	N13	2016-019	TU0018	SYS
2017-S-045	0019	N12	2016-114	TU0018	GRAB
2017-S-046	0058	N8	2016-070	Duira	SYS
2017-S-047	0034	N10	2016-049	Dhar Taouazza	SYS
2017-S-048	0078	N10	2016-088	TU0076	SYS
2017-S-049	0079	N10	2016-086	TU0076	SYS
2017-S-050	0078	N1	2016-088	TU0076	SYS
2017-S-051	0035	N1	2016-100	Dhar Taouazza	SYS
2017-S-052	0078	N10	2016-088	TU0076	SYS
2017-S-053	0078	N1	2016-088	TU0076	SYS
2017-S-054	0035	N1	2016-051	Dhar Taouazza	SYS
2017-S-055	0078	N13	2016-088	TU0076	SYS
2017-S-056	0078	N8	2016-088	TU0076	SYS
2017-S-057	0078	N10	2016-088	TU0076	SYS
2017-S-060	0034	N11	2016-049	Dhar Taouazza	SYS
2017-S-061	0040	N10	2016-054	Douar Dhayriya	SYS
2017-S-062	0102	N8	2016-115	TU0102	GRAB
2017-S-063	0015	N10	2016-013	Sidi Khayri	SYS
2017-S-064	0015	N10	2016-014	N/A	GRAB
2017-S-065	0026	N13	2016-028	N/A	SYS

Table A.1 – continued from previous page

Study Lot	TU	Fabric	Accession Lot	Site Name	SYS/GRAB
2017-S-066	0033	N8	2016-048	N/A	SYS
2017-S-067	0048	N10	2016-059	Sidi Khayri	SYS
2017-S-068	0049	N8	2016-066	Sidi Khayri	GRAB
2017-S-069	0063	N6	2016-090	Duira	SYS
2017-S-070	0063	N1	2016-090	N/A	SYS
2017-S-071	0080	N1	2016-091	N/A	SYS
2017-S-072	0075	N1	2016-093	Legaadi	SYS
2017-S-073	0083	N1	2016-097	N/A	SYS
2017-S-074	0083	N8	2016-097	N/A	SYS
2017-S-075	0103	N6	2016-116	TU0103	GRAB
2017-S-076	0040	N6	2016-055	Douar Dhayriya	SYS
2017-S-080	0079	N13	2016-086	TU0076	SYS
2017-S-081	0023	N10	2016-035	TU0023	SYS
2017-S-082	0043	N10	2016-053	Douar Dhayriya	SYS
2017-S-083	0023	N13	2016-035	TU0023	SYS
2017-S-084	0035	N11	2016-051	Dhar Taouazza	SYS
2017-S-085	0079	N8	2016-086	TU0076	SYS
2017-S-086	0018	N13	2016-018	TU0018	SYS
2017-S-087	0053	N10	2016-073	N/A	GRAB
2017-S-088	0063	N10	2016-081	Duira	SYS
2017-S-089	0082	N10	2016-096	N/A	SYS
2017-S-090	0082	N8	2016-096	N/A	SYS
2017-S-091	0052	N10	2016-064	N/A	SYS
2017-S-092	0049	N8	2016-060	Sidi Khayri	SYS
2017-S-093	0023	N10	2016-030	TU0023	SYS
2017-S-094	0102	N8	2016-115	TU0102	GRAB
2017-S-095	0058	N8	2016-070	Duira	SYS
2017-S-096	0019	N13	2016-007	TU0018	GRAB

Table A.1 – continued from previous page

Study Lot	TU	Fabric	Accession Lot	Site Name	SYS/GRAB
2017-S-097	0015	N12	2016-013	N/A	SYS
2017-S-098	0103	N12	2016-117	TU0103	SYS
2017-S-103	0101	N11	2016-114	TU0101	GRAB

B Ceramics Drawings

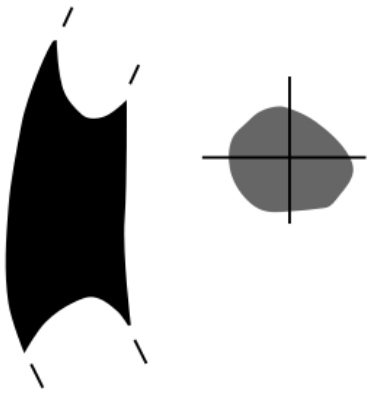

Figure B.1: 2017S-071 Drawing; Fabric N1

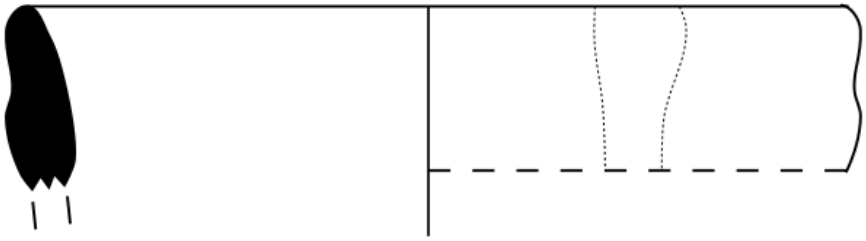

Figure B.2: 2017S-006 Drawing; Fabric N1

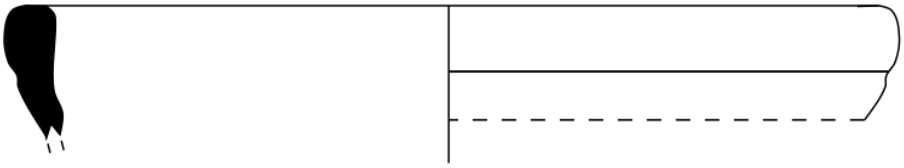

Figure B.3: 2017S-076 Drawing; Fabric N6

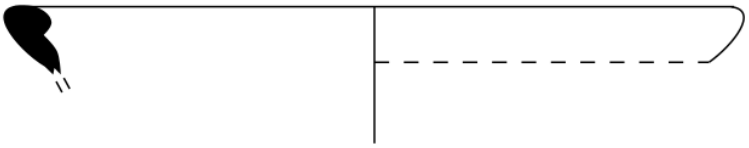

Figure B.4: 2017S-010 Drawing; Fabric N6

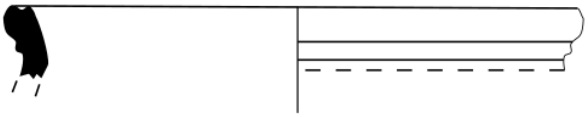

Figure B.5: 2017S-009 Drawing; Fabric N6

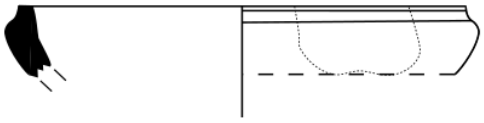

Figure B.6: 2017S-007 Drawing; Fabric N6

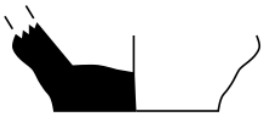

Figure B.7: 2017S-075 Drawing; Fabric N6

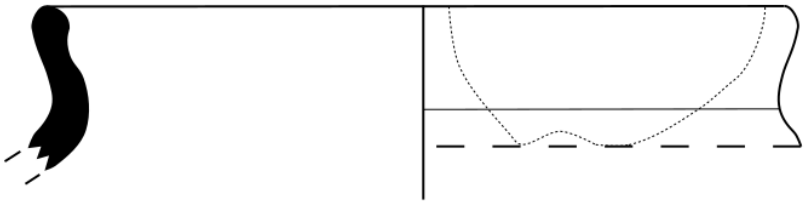

Figure B.8: 2017S-046 Drawing; Fabric N8

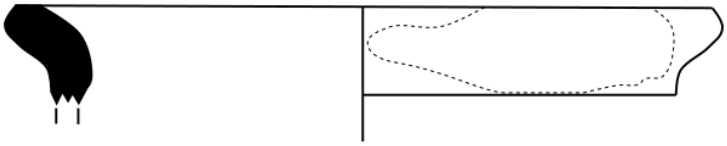

Figure B.9: 2017S-021 Drawing; Fabric N8

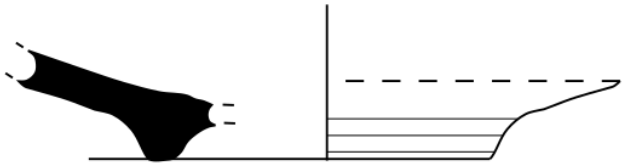

Figure B.10: 2017S-056 Drawing; Fabric N8

Figure B.11: 2017S-031 Drawing; Fabric N8

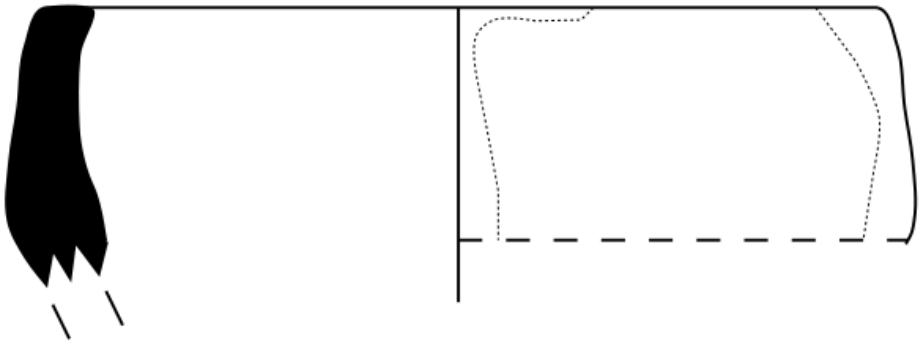

Figure B.12: 2017S-081 Drawing; Fabric N10

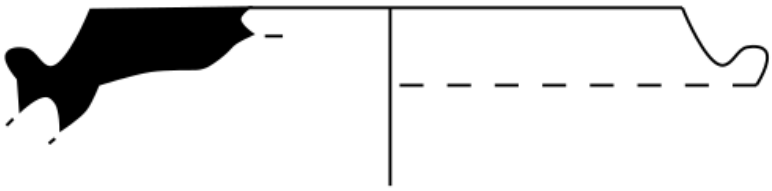

Figure B.13: 2017S-087 Drawing; Fabric N10

Figure B.14: 2017S-029 Drawing; Fabric N10

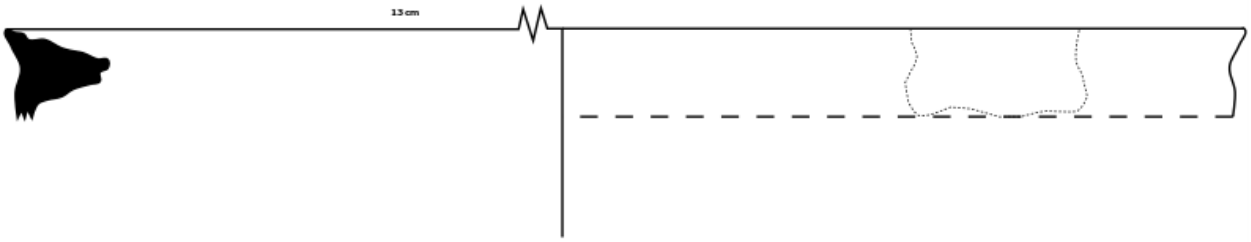

Figure B.15: 2017S-037.1 Drawing; Fabric N11

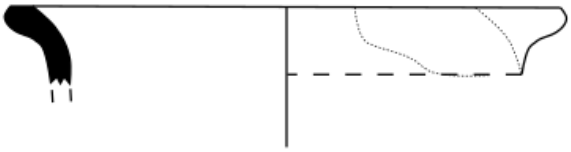

Figure B.16: 2017S-037.2 Drawing; Fabric N11

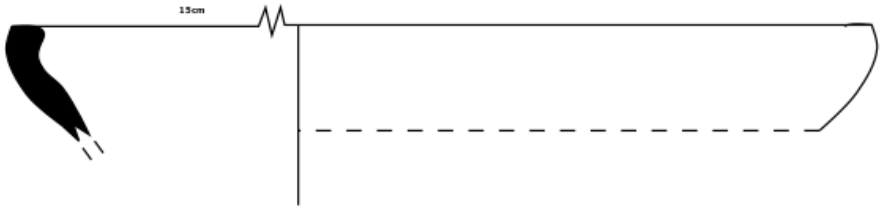

Figure B.17: 2017S-060 Drawing; Fabric N11

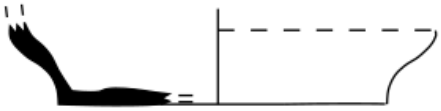

Figure B.18: 2017S-103 Drawing; Fabric N11

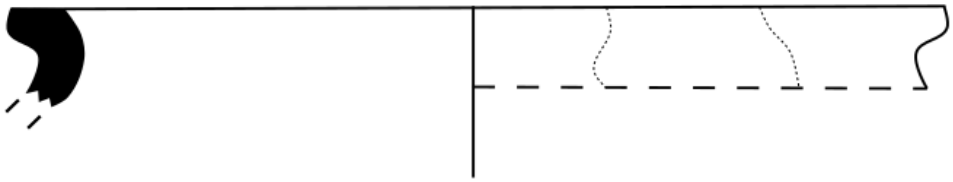

Figure B.19: 2017S-045 Drawing; Fabric N12

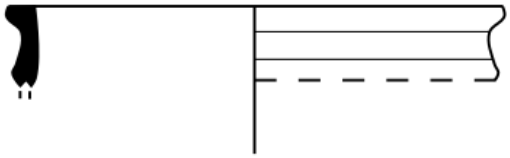

Figure B.20: 2017S-041 Drawing; Fabric N12

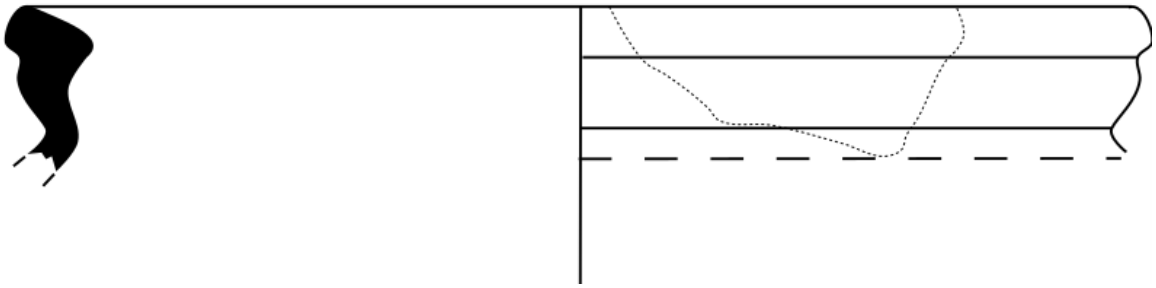

Figure B.21: 2017S-042 Drawing; Fabric N13

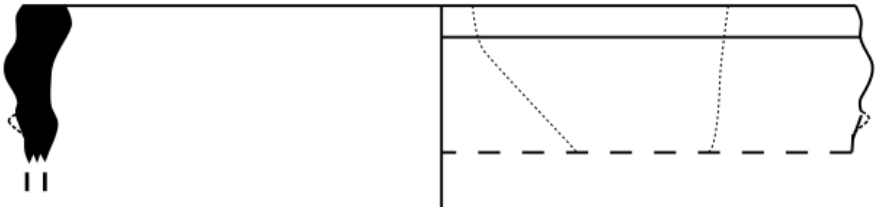

Figure B.22: 2017S-096 Drawing; Fabric N13

C Ceramics Photos

Figure C.1: 2017S-002; Fabric N1

Figure C.2: 2017S-006; Fabric N1

Figure C.3: 2017S-071; Fabric N1

Figure C.4: 2017S-007; Fabric N6

Figure C.5: 2017S-009; Fabric N6

Figure C.6: 2017S-010; Fabric N6

Figure C.7: 2017S-020; Fabric N6

Figure C.8: 2017S-075; Fabric N6

Figure C.9: 2017S-076; Fabric N6

Figure C.10: 2017S-021; Fabric N8

Figure C.11: 2017S-022; Fabric N8

Figure C.12: 2017S-031; Fabric N8

Figure C.13: 2017S-046; Fabric N8

Figure C.14: 2017S-056; Fabric N8

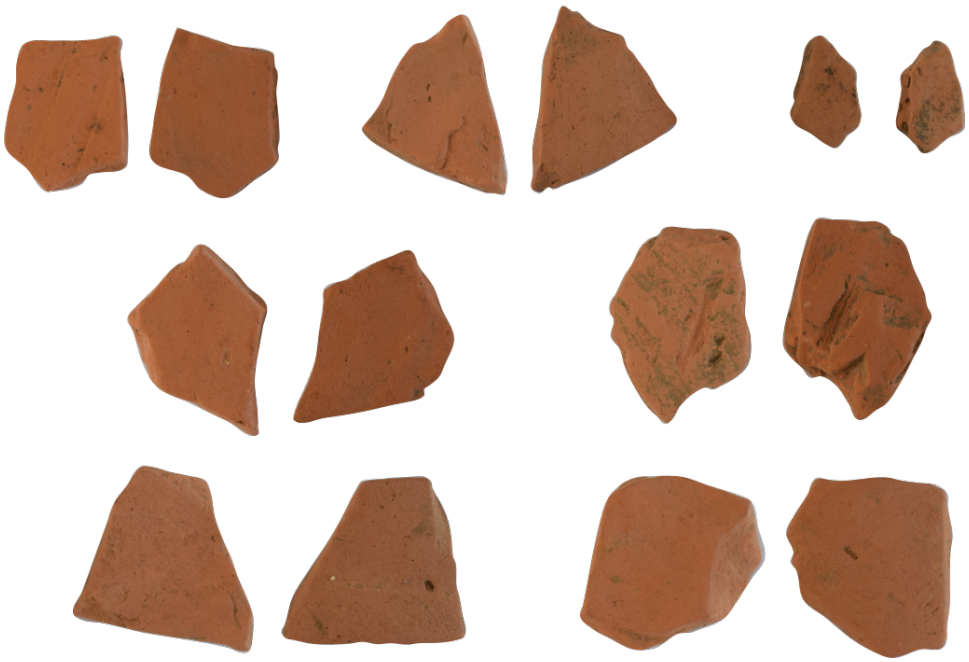

Figure C.15: 2017S-027; Fabric N10

Figure C.16: 2017S-029; Fabric N10

Figure C.17: 2017S-081; Fabric N10

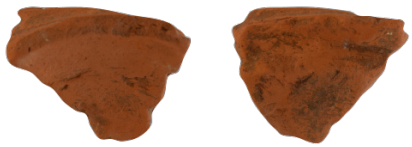

Figure C.18: 2017S-087; Fabric N10

Figure C.19: 2017S-061; Fabric N10

Figure C.20: 2017S-037; Fabric N11

Figure C.21: 2017S-060; Fabric N11

Figure C.22: 2017S-103; Fabric N11

Figure C.23: 2017S-040; Fabric N12

Figure C.24: 2017S-041; Fabric N12

Figure C.25: 2017S-045; Fabric N12

Figure C.26: 2017S-097; Fabric N12

Figure C.27: 2017S-098; Fabric N12

Figure C.28: 2017S-042; Fabric N13

Figure C.29: 2017S-055; Fabric N13

Figure C.30: 2017S-083; Fabric N13

Figure C.31: 2017S-086; Fabric N13

Figure C.32: 2017S-096; Fabric N13

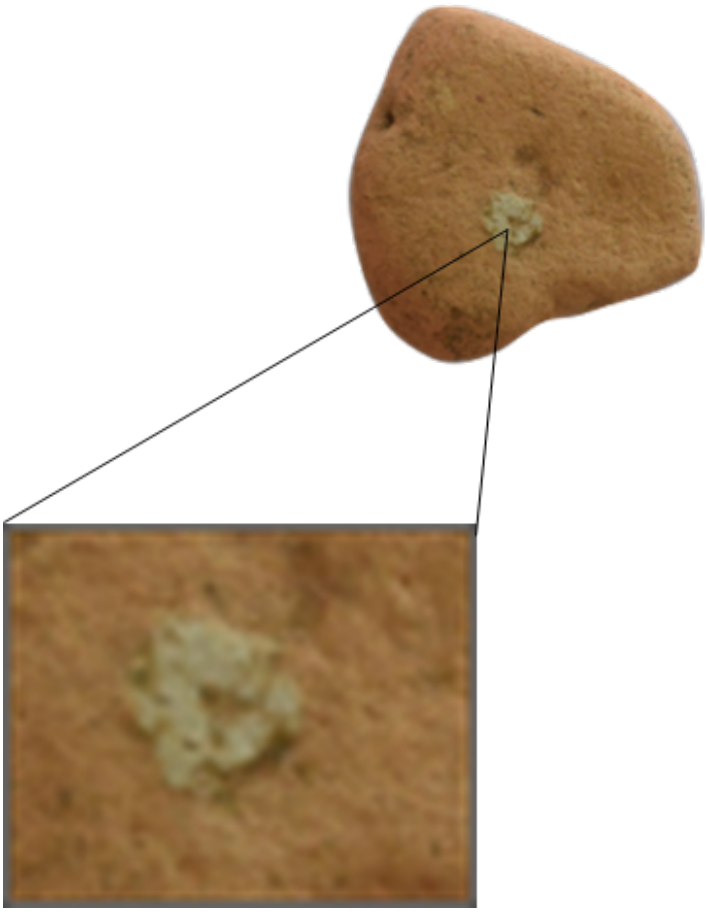

Figure C.33: Fabric N1 calcite closeup; 2017S-002

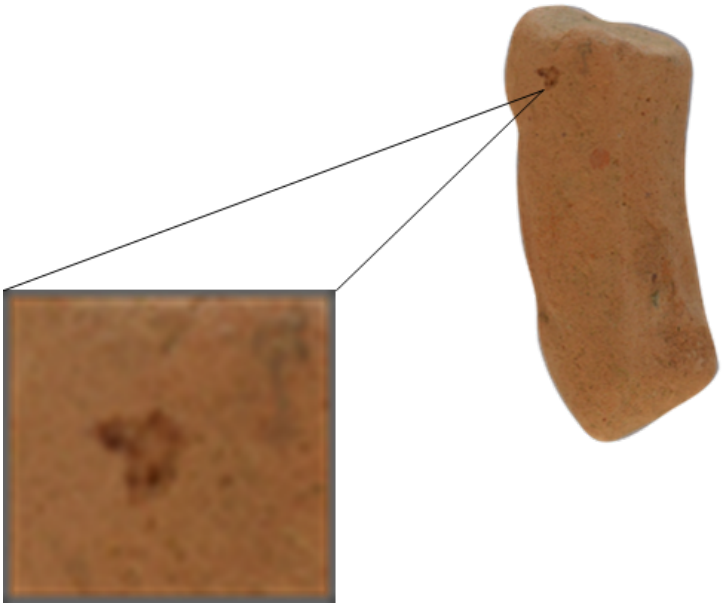

Figure C.34: Fabric N1 argillaceous rock closeup; 2017S-071

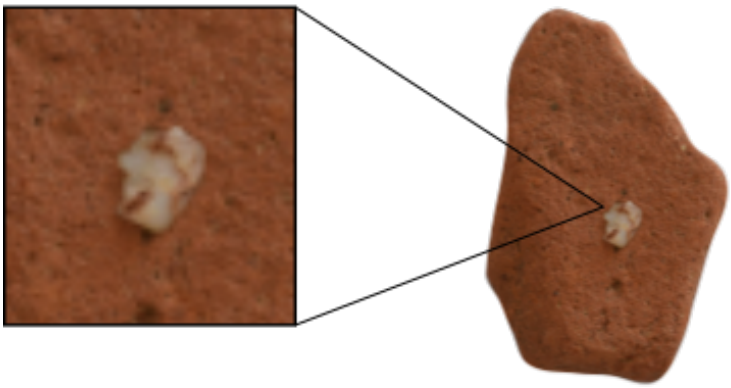

Figure C.35: Fabric N6 quartzite closeup; 2017S-010

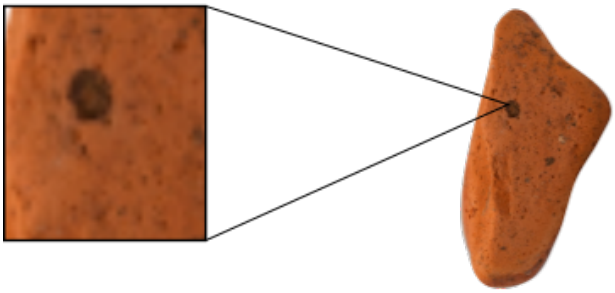

Figure C.36: Fabric N6 argillaceous rock closeup; 2017S-020

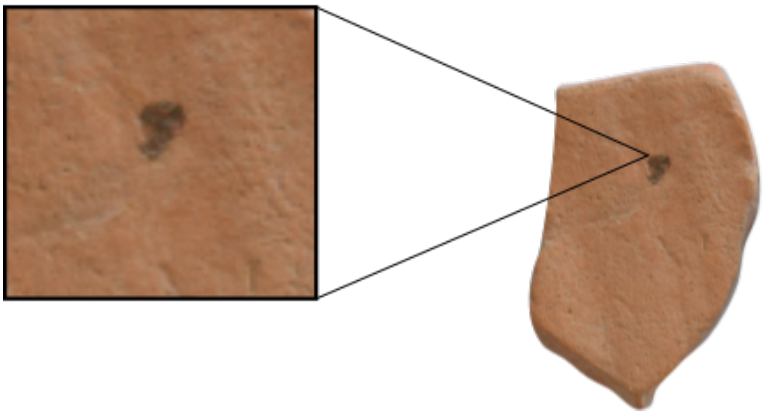

Figure C.37: Fabric N8 argillaceous rock closeup; 2017S-022

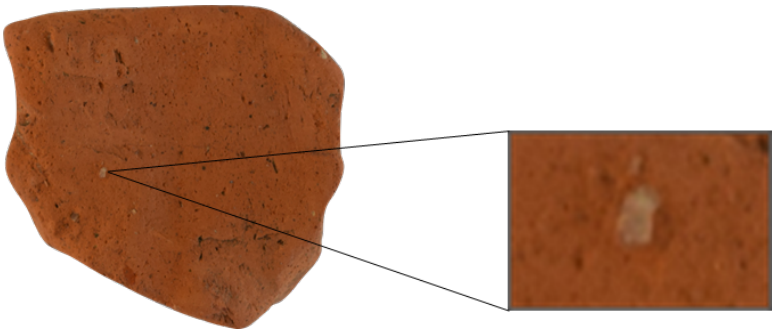

Figure C.38: Fabric N10 quartzite closeup; 2017S-052

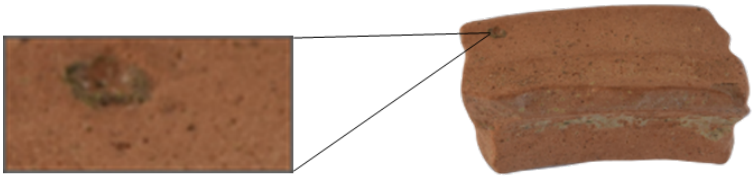

Figure C.39: Fabric N11 argillaceous rock closeup; 2017S-037

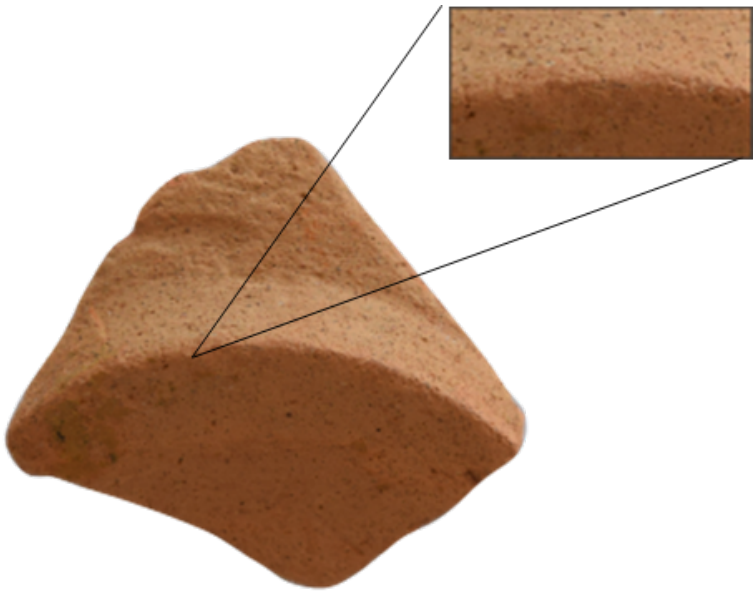

Figure C.40: Fabric N11 black inclusion closeup; 2017S-103

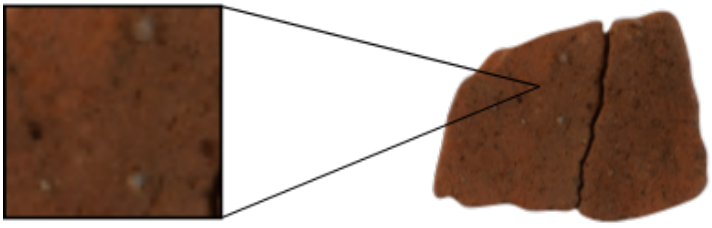

Figure C.41: Fabric N12 calcite closeup; 2017S-040

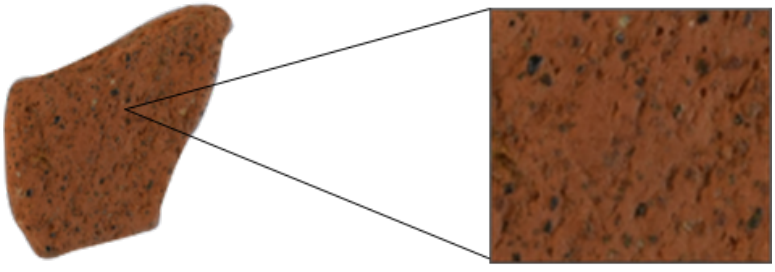

Figure C.42: Fabric N13 black inclusion closeup; 2017S-042

Vita

Emily Noyes was born in Heidelberg, Germany in 1995. She spent most of her life on military bases with her mother and step-father who were both in the Army, and eventually settled in Clarksville, TN. She graduated Summa Cum Laude with a B.A. in Anthropology from the University of Tennessee, Chattanooga in 2016 and an M.A. in Mediterranean Archaeology from the University of Tennessee, Knoxville in 2018. She intends to pursue a career teaching Classics and Latin.